



April 2017

MARINE CORPS ASIA PACIFIC REALIGNMENT

DOD Should Resolve
Capability
Deficiencies and
Infrastructure Risks
and Revise Cost
Estimates

GAO Highlights

Highlights of [GAO-17-415](#), a report to congressional committees

Why GAO Did This Study

For two decades, DOD has planned to realign its presence in the Asia-Pacific region. The Marine Corps has plans to consolidate bases in Okinawa, relocating 4,100 Marines to Guam, 2,700 to Hawaii, 800 to the continental United States, and a rotational presence of 1,300 to Australia.

The Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2016, included a provision that GAO study the realignment initiatives in the Asia-Pacific region. This report assesses the extent to which DOD has (1) coordinated its efforts and resolved selected identified capability deficiencies related to the relocation of Marines, (2) developed infrastructure plans and schedules and completed risk planning for its infrastructure that will support the relocation, and (3) developed reliable cost estimates for infrastructure for the relocation of Marines to Guam and Hawaii and the rotational presence in Australia. GAO reviewed relevant policies and plans; analyzed cost documents; interviewed DOD officials; and visited U.S. military installations in the Asia-Pacific region.

What GAO Recommends

GAO recommends that DOD resolve capability deficiencies in the four selected identified areas, update its schedule for Guam infrastructure, complete a risk-management plan for Guam infrastructure, and revise its three cost estimates. DOD concurred with two recommendations, partially concurred with six, and did not concur with one. GAO continues to believe its recommendations are valid, as discussed in this report.

View [GAO-17-415](#). For more information, contact Brian Lepore at (202) 512-4523 or leporeb@gao.gov.

April 2017

MARINE CORPS ASIA PACIFIC REALIGNMENT

DOD Should Resolve Capability Deficiencies and Infrastructure Risks and Revise Cost Estimates

What GAO Found

The Department of Defense (DOD) has coordinated the relocation of Marines from Okinawa to other locations in the Asia-Pacific region through developing a synchronization plan and organizing working groups. However, DOD has not resolved selected identified capability deficiencies related to the relocation of Marine units; training needs in the region; the reduction in runway length at the Futenma Replacement Facility in Okinawa; and challenges for operating in Australia. DOD guidance indicates that mission requirements—which would include the capabilities needed to fulfill the mission—largely determine land and facility support requirements. If DOD does not resolve the selected identified capability deficiencies in its infrastructure plans, DOD may be unable to maintain its capabilities or face much higher costs to do so.

DOD has taken steps to develop infrastructure plans and schedules for its relocation efforts, but it did not develop a reliable schedule for the Marine relocation to Guam and has not completed its risk planning for infrastructure in Guam. DOD developed plans that will support construction efforts in Guam and Japan, and developed some initial infrastructure plans for Hawaii and Australia. However, GAO found the Marines Corps' integrated master schedule for Guam did not fully meet the comprehensive, well-constructed, and credible characteristics for a reliable schedule. For example, the schedule does not include resources needed for nonconstruction activities, such as information technology and design activities. Additionally, the Marine Corps has not completed its risk-management plan for infrastructure construction in Guam. Specifically, the Marine Corps has not identified its strategy to address construction risks including labor shortages and endangered-species protection. If DOD does not have a reliable schedule or has not completed risk planning for Guam, it may not have complete information to identify and address risks that may result in cost overruns and schedule delays.

DOD has made progress in developing cost estimates for Guam, but its estimates partially met GAO best practices for reliable cost estimates for the relocations to Guam and Hawaii and the establishment of a rotational presence in Australia. For cost estimates related to Guam military construction activities, DOD included ground rules and assumptions, but did not include some elements of a reliable cost estimate, such as a risk analysis. Additionally, DOD developed cost estimates for nonmilitary construction activities that provide a high-level planning overview of the requirements, but they did not incorporate several other best practices, including a unifying Work Breakdown Structure that defines in detail the work necessary to accomplish a program's objectives. For Hawaii and Australia, the cost estimates are not considered reliable because they did not include all life-cycle costs or a Work Breakdown Structure. If DOD does not revise the cost estimates for these locations, decision makers in DOD and Congress will not have reliable cost information to inform funding decisions and to help them determine the viability of relocation of Marines to Hawaii and the establishment of a rotational presence in Australia.

Contents

Letter		1
	Background	6
	DOD Has Coordinated Its Efforts for Relocating Marines from Okinawa but Has Not Fully Resolved Selected Identified Capability Deficiencies	15
	DOD Has Taken Steps to Develop Infrastructure Plans and Schedules for Its Relocation but Did Not Develop a Reliable Schedule for Guam and Has Not Completed Risk Planning in Guam and Okinawa	26
	DOD Has Made Progress in Developing Its Infrastructure Cost Estimates for Guam, Hawaii, and Australia but Its Estimates Partially Met Best Practices for a Reliable Cost Estimate	41
	Conclusions	49
	Recommendations for Executive Action	50
	Agency Comments and Our Evaluation	51
Appendix I	Objectives, Scope, and Methodology	61
Appendix II	Defense Policy Review Initiative	67
Appendix III	GAO Assessment of the Marine Corps' Integrated Master Schedule for Guam	69
Appendix IV	Assessment Tables of DOD's Realignment Cost Estimates for Guam Compared to Characteristics for Reliable Cost Estimates	72
Appendix V	Assessment of DOD's Realignment Cost Estimates for Hawaii and Australia	79
Appendix VI	Comments from the Department of Defense	80

Appendix VII	GAO Contact and Staff Acknowledgments	86
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Related GAO Products		87
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Tables

Table 1: Summary Assessment of the Marine Corps' Integrated Master Schedule for Guam Compared to Characteristics for Reliable Schedules	32
Table 2: Summary of GAO's Assessment of DOD's Relocation Cost Estimates for Guam Compared to Characteristics for Reliable Cost Estimates	44
Table 3: Summary of GAO's Assessment of DOD's Cost Estimates for Hawaii and Australia Compared to the Comprehensive Characteristic for Reliable Cost Estimates	47
Table 4: Defense Policy Review Initiatives	67
Table 5: Assessment Tables of the Marine Corps' Integrated Master Schedule for Guam Compared to Characteristics of Reliable Schedules	70
Table 6: Assessment of the DOD Realignment Cost Estimates for Guam Military Construction Compared to Characteristics for Reliable Cost Estimates	72
Table 7: Assessment of the DOD Realignment Cost Estimates for Guam Nonmilitary Construction Compared to Characteristics for Reliable Cost Estimates	75
Table 8: Assessment of DOD's Realignment Cost Estimates for Hawaii and Australia Compared to GAO's Comprehensive Characteristic for Reliable Cost Estimates	79

Figures

Figure 1: Planned Location of Replacement Runway at Camp Schwab	8
Figure 2: Planned Redistribution of Marine Corps Forces in the Asia-Pacific Region	9
Figure 3: Okinawa Consolidation Plan	12
Figure 4: Department of Defense Offices with Roles in the Asia-Pacific Relocation, and Their Locations	14

Figure 5: Milestones Reflected in the Marine Corps Synchronization Matrix for the Asia-Pacific Relocation up to 2030	16
Figure 6: The Department of Defense's Challenges for Operating in Australia	23
Figure 7: Flooding in Australia's Bradshaw Field Training Area during the Rainy Season	24
Figure 8: Explosive-Ordnance Detection and Removal at a Utilities Project in Guam	37
Figure 9: Cultural Artifacts Discovered during Construction at Various Department of Defense Sites, Guam	38
Figure 10: Okinawa Bases That the Department of Defense Identified Will Require Sustainment While It Waits on Relocation Activities	40
Figure 11: Four Characteristics of a Reliable Cost Estimate	43

Abbreviations

2006 Roadmap	U.S.–Japan Roadmap
CNMI	Commonwealth of the Northern Mariana Islands
DOD	Department of Defense
DPRI	Defense Policy Review Initiative

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April 5, 2017

Congressional Committees

Attempts to realign the Department of Defense's (DOD) presence in the Asia-Pacific region have been ongoing for two decades, with a particular focus on the movement of Marines from Okinawa, Japan, to other regional locations. Japan serves as the United States' most significant forward-operating location in the Asia-Pacific region, accommodating approximately 55,000 U.S. military personnel, 42,000 dependents, and 9,400 DOD civilian employees, as of the second quarter of fiscal year 2016. The majority of this presence resides in Okinawa, an island prefecture south of the Japanese mainland that represents less than 1 percent of Japan's entire land mass. Although it is small compared to the entirety of Japan's land mass, Okinawa's U.S. bases house approximately 29,000 military personnel (including about 18,000 Marine Corps personnel) on any given day. To balance the importance of this forward presence to both the United States and Japan with the stated need to reduce the impact on the Okinawa community, in April 2012 the U.S. and Japanese governments adjusted the realignment plans.¹ Specifically, in an effort to reach this balance and realign its presence in the Asia-Pacific region, the Marine Corps plans to consolidate bases in southern Okinawa and relocate 4,100 Marines to Guam, 2,700 to Hawaii, 800 to the continental United States, and 1,300 (on a rotational basis) to Australia.²

This report is one of a series of reports on DOD's Asia-Pacific realignment. In May 2011, we reported on U.S. defense posture in Asia, highlighting the need for additional cost information and methods for evaluating posture in that region.³ We recommended, among other

¹See *U.S.-Japan Security Consultative Committee, Joint Statement of the Security Consultative Committee* (Apr. 26, 2012). Prior to this April 2012 adjusted realignment plan, the United States and Japan had planned to move approximately 8,000 Marines from Okinawa to Guam in an effort to reduce the impact on the Okinawa community.

²These relocation numbers refer specifically to the Marines relocating from Okinawa. According to the Marine Corps and Pacific Command, additional Marines will relocate to Guam and Australia from other locations.

³GAO, *Defense Management: Comprehensive Cost Information and Analysis of Alternatives Needed to Assess Military Posture in Asia*, [GAO-11-316](#) (Washington, D.C.: May 25, 2011).

things, that DOD develop annual cost estimates for posture in the U.S. Pacific Command's area of responsibility. In part in response to our report, since early 2012 DOD has reported its cost estimates for new or ongoing posture initiatives in the annual U.S. Global Defense Posture Report to Congress. In June 2013, we reported that DOD did not include detailed information on requirements for several key cost components needed for its cost estimate for Guam, had not developed an integrated master plan for the relocation, and had not identified sustainment needs and costs for U.S. forces on Okinawa and Guam.⁴ We recommended, among other things, that DOD update its cost estimate to include seven cost components, develop an integrated master plan for the relocation of Marines, and identify sustainment requirements for affected facilities until relocation initiatives are complete. DOD generally agreed with our recommendations, and as of August 2016 had implemented two of the six recommendations.⁵ However, work remains regarding the development of cost estimates and updates to the relocation planning efforts as discussed later in the report. The Related GAO Products page at the end of this report provides a listing of our related work.

The Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2016, included a provision that we study matters related to the various realignment initiatives in the Asia-Pacific region.⁶ This report assesses the extent to which DOD has (1) coordinated its efforts and resolved selected identified capability deficiencies related to the relocation of Marines from Okinawa, (2) developed infrastructure plans and schedules for its relocation efforts and completed risk planning for its infrastructure that will support the relocation, and (3) developed

⁴GAO, *Defense Management: More Reliable Cost Estimates and Further Planning Needed to Inform the Marine Corps Realignment Initiatives in the Pacific*, [GAO-13-360](#) (Washington, D.C.: June 11, 2013).

⁵In addition, in our 2013 report we recommended that the Army Corps of Engineers develop a strategy to identify how the design and construction process of Defense Policy Review Initiative (DPRI) projects should be handled moving forward and the necessary resources needed to support any surge in construction associated with posture-related initiatives in both Iwakuni and Okinawa. In response to our recommendation, the Army Corps of Engineers stated it began completing mission analysis studies every 6 months to identify needed resources. Additionally, we recommended in 2013 that the Secretary of the Navy conduct an economic analysis to include assessing the costs of maintaining vacant housing on Guam. According to officials, the Department of the Navy completed a housing market analysis to establish a baseline for long-term military housing requirements on Guam in 2013 and documented this baseline in 2015.

⁶161 Cong. Rec. H10,378 (daily ed. Dec. 17, 2015).

reliable cost estimates for infrastructure for the relocation to Guam and Hawaii and for the rotational presence in Australia.

This report is a public version of a sensitive report that we are issuing concurrently.⁷ DOD deemed some of the information in the sensitive report as For Official Use Only, which must be protected from public disclosure. Therefore, this report omits For Official Use Only information and data on some of the Navy and Marine Corps plans and programs associated with the realignment effort, deployment and allies' considerations, and estimates of future actions and political concerns associated with Marine Corps forward stationing. Although the information provided in this report is more limited in scope, it addresses the same objectives as the sensitive report. Also, the methodology used for both reports is the same.

For all objectives, the scope of our review was actions taken since we last reviewed Marine Corps realignment initiatives in the Asia-Pacific region in June 2013.⁸ We reviewed relevant policies and procedures, and we collected information by interviewing and communicating with officials from the Office of the Under Secretary of Defense (Policy), the Office of the Under Secretary of Defense (Comptroller), the Air Force, the Army, the Navy, the Marine Corps, and the State Department. We also conducted site visits in Hawaii, Japan, and Guam. In Hawaii, we met with Pacific Command and its service components. In Japan, we met with U.S. Forces–Japan and the services, Marine Corps Installation Command Pacific, III Marine Expeditionary Force, the U.S. Embassy in Tokyo, and the U.S. Consulate on Okinawa, and observed infrastructure conditions in Okinawa and Iwakuni. In Guam, we met with DOD and government of Guam officials and observed infrastructure conditions and the buildup of Marine Corps Base Guam. Additionally, we interviewed DOD officials and officials from the U.S. Embassy in Australia. We also met with DOD's construction agents, specifically the U.S. Army Corps of Engineers and the Naval Facilities Engineering Command.

To determine the extent to which DOD has coordinated efforts and resolved selected identified capability deficiencies related to the

⁷GAO, *Marine Corps Asia-Pacific Realignment: DOD Should Resolve Capability Deficiencies and Infrastructure Risks and Revise Cost Estimates*, GAO-17-107SU (Washington, D.C.: Apr. 5, 2017).

⁸[GAO-13-360](#).

relocation of Marines from Okinawa, we reviewed DOD documentation and interviewed knowledgeable officials. Specifically, we reviewed documentation such as the Marine Corps' Asia-Pacific Realignment Synchronization Matrix and capability documents such as training requirement documentation. We also interviewed senior DOD officials to identify any capability deficiencies that could cause units to not be fully prepared for their missions, and we reviewed related documentation to support DOD's identification of those selected capabilities. We compared DOD's decision-making process for plans to resolve the identified capability deficiencies to DOD Unified Facilities Criteria regarding use of mission needs to largely determine land and facility support requirements.⁹

To determine the extent that DOD has developed plans and completed risk planning for its infrastructure, we reviewed DOD guidance related to the development of installation plans, integrated master schedules, and risk planning. We identified current infrastructure plans and integrated master schedules. Specifically, we reviewed the Guam integrated master schedule and compared that schedule's content to the key practices in GAO's *Schedule Assessment Guide* to assess whether the schedule captures the basic elements needed to implement a program and to determine the extent to which projects were properly sequenced.¹⁰ We also reviewed documentation and conducted interviews with DOD officials to determine any identified risks with DOD's plans and schedules as well as actions DOD has taken to address those risks. We compared DOD's risk planning efforts outlined in that documentation to DOD guidance on addressing risk, such as guidance that identifies the characteristics

⁹Department of Defense, Unified Facilities Criteria 2-100-01, *Installation Master Planning* (May 15, 2012).

¹⁰GAO, *Schedule Assessment Guide: Best Practices for Project Schedules*, [GAO-16-89G](#) (Washington, D.C.: Dec. 22, 2015). The Marine Corps also began developing integrated master schedules for realignment activities in Japan, such as for the Okinawa Consolidation and Futenma Replacement Facility. We did not assess the integrated master schedule for Okinawa Consolidation because, at the time of our review, it was not yet developed. We did not assess the integrated master schedule for the Futenma Replacement Facility because officials said the schedule was subject to changes based on ongoing legal issues with the government of Japan. While the Marine Corps developed a schedule for Marine Corps Air Station Iwakuni, we also did not assess the integrated master schedule for this location because most of the construction projects for this base had already begun.

needed in a risk-management plan and guidance on how DOD plans for infrastructure sustainment in base master plans.¹¹

To determine the extent to which DOD has developed reliable cost estimates for infrastructure, we reviewed DOD's cost estimates and analyses and interviewed DOD officials about costs and funding sources related to infrastructure in Guam, Australia, and Hawaii. We compared those estimates and analyses to the best practices included in GAO's *Cost Estimating and Assessment Guide*.¹² According to GAO's *Cost Estimating and Assessment Guide*, a cost estimate is considered reliable if it is comprehensive, well-documented, accurate, and credible.¹³ Appendix I provides a more-detailed description of our scope and methodology.

We conducted this performance audit from January 2016 to April 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

¹¹Department of Defense, *DOD Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs* (Washington, D.C.: June 2015). Although this guidance is specific to the defense acquisition context, officials from the Navy's Guam Program Management Office stated that they will base the risk-management plan on principles found within it. See Department of Defense Instruction 4165.70, *Real Property Management*, para. 6.1 (Apr. 6, 2005).

¹²GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: Mar. 2, 2009).

¹³[GAO-09-3SP](#).

Background

History and Status of Realignment of U.S. Forces in Japan

The U.S.–Japan alliance dates back to the U.S. occupation of Japan after its defeat in World War II. The alliance is supported by the 1960 Treaty of Mutual Cooperation and Security and a related Status of Forces Agreement.¹⁴ As a result of the treaty, the Status of Forces Agreement, and related agreements, U.S. forces are able to use nearly 90 installations throughout mainland Japan and Okinawa for the purpose of contributing to the security of Japan and the maintenance of international peace and security in the region.

One issue that remains at the forefront of the alliance is the realignment of U.S. forces in Japan. Efforts to realign U.S. forces in Japan date back to 1995. We have previously reported that discontent among the people of Okinawa regarding the U.S. military presence led to efforts in the 1990s to consolidate, realign, and reduce U.S. facilities and areas and adjust the operational procedures of U.S. forces in Okinawa to reduce the impact on local communities.¹⁵ However, as we had reported, realignment efforts did not make much progress until the end of 2002, when the United States and Japan launched a series of realignment initiatives called the Defense Policy Review Initiative (DPRI). Under DPRI, both countries were seeking to reduce the U.S. footprint in Okinawa, enhance interoperability and communication, and better position U.S. forces to respond to a changing security environment. The major realignment initiatives under DPRI were outlined in the U.S.–Japan Roadmap for Realignment Implementation (2006 Roadmap) and subsequently

¹⁴See Treaty of Mutual Cooperation and Security, U.S.–Japan, Jan. 19, 1960, 11 U.S.T. 1632; Agreement Under Article VI of the Treaty of Mutual Cooperation and Security: Facilities and Areas and the Status of United States Armed Forces in Japan, U.S.–Japan, Jan. 19, 1960, 11 U.S.T. 1652.

¹⁵See GAO, *Overseas Presence: Issues Involved in Reducing the Impact of the U.S. Military Presence on Okinawa*, [GAO/NSIAD-98-66](#) (Washington, D.C.: Mar. 2, 1998).

Constructing and Moving
Forces to the Futenma
Replacement Facility

adjusted, most recently through a joint statement issued in April 2012.¹⁶ There are four initiatives under DPRI that are specific to the realignment of Marine Corps forces in the Pacific:

1. Constructing and moving forces to the Futenma Replacement Facility,
2. Relocating Marine Corps units from Okinawa to Guam, Hawaii, the continental United States, and Australia,¹⁷
3. Consolidating installations on Okinawa, and
4. Moving Marines to Iwakuni.¹⁸

As envisioned by the 2006 Roadmap, the U.S. government would return to Japan the Marine Corps Air Station Futenma in Okinawa once the government of Japan constructed a fully operational replacement facility (Futenma Replacement Facility), including a runway, in a northern, less-populated area of the island.¹⁹ This facility was originally projected to be completed by 2014, but delays have slowed its progress. According to the

¹⁶See U.S.-Japan Security Consultative Committee, *Joint Statement of the Security Consultative Committee* (Apr. 26, 2012). In February 2009, the United States and Japan signed an agreement regarding relocation of Marines to Guam, in part implementing the 2006 Roadmap. See Agreement Concerning the Implementation of the Relocation of III Marine Expeditionary Force Personnel and Their Dependents from Okinawa to Guam, U.S.-Japan, Feb. 17, 2009, T.I.A.S. No. 09-519. In October 2013, the United States and Japan amended the agreement, in part to implement the April 2012 statement. See Protocol Amending the Agreement Concerning the Implementation of the Relocation of III Marine Expeditionary Force Personnel and Their Dependents from Okinawa to Guam, U.S.-Japan, Oct. 3, 2013, T.I.A.S. No. 09-519.

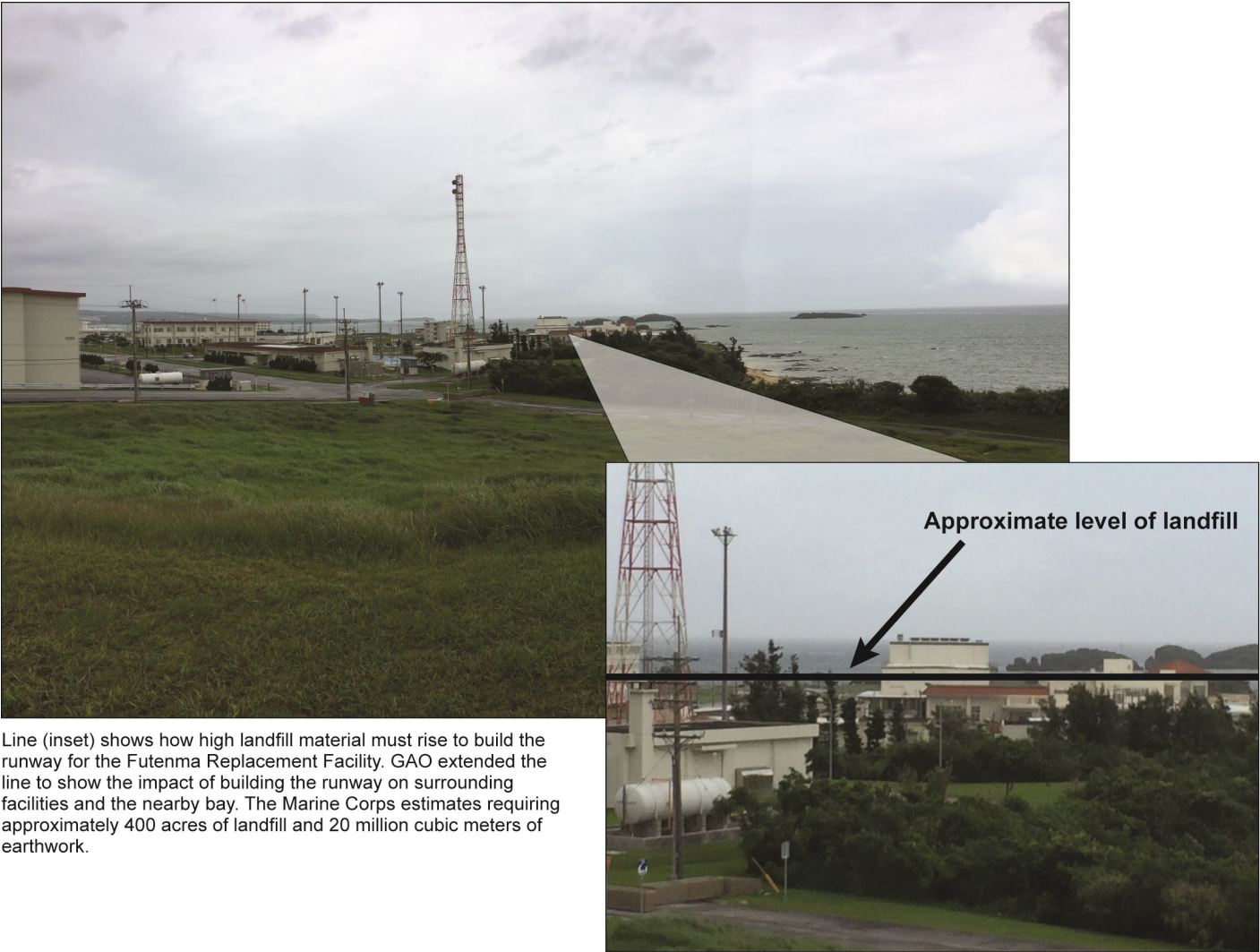
¹⁷While the rotational presence to Australia was not part of DPRI, one of DOD's initiatives to reduce the number of U.S. forces in Japan is to have Marine Corps units that currently rotate through Okinawa to instead rotate through Australia.

¹⁸DPRI consists of a package of 19 interrelated and interdependent initiatives for Japan and Guam and other areas in the Pacific Command area of responsibility, such as Tinian in the Commonwealth of the Northern Mariana Islands. These initiatives affect all military services within DOD. For the purposes of this report, we have aggregated several of the initiatives into four that relate specifically to the Marine Corps plans to realign its forces in the Pacific. For a summary of the 19 initiatives, see app. II.

¹⁹The plan to return Marine Corps Air Station Futenma to the government of Japan dates back to 1997. See *Special Action Committee on Okinawa Final Report* (Aug. 5, 1997). According to the Marine Corps, in addition to the completion of the Futenma Replacement Facility, other features must be completed by the government of Japan prior to returning Marine Corps Air Station Futenma, such as the relocation of units and improved contingency use of civilian facilities for long runway operations.

officials, as of June 2016, 9 of 184 projects have been constructed at the planned site of the realignment—Camp Schwab. Figure 1 shows the planned location of the runway at Camp Schwab and how high landfill material must rise to build the runway.

Figure 1: Planned Location of Replacement Runway at Camp Schwab



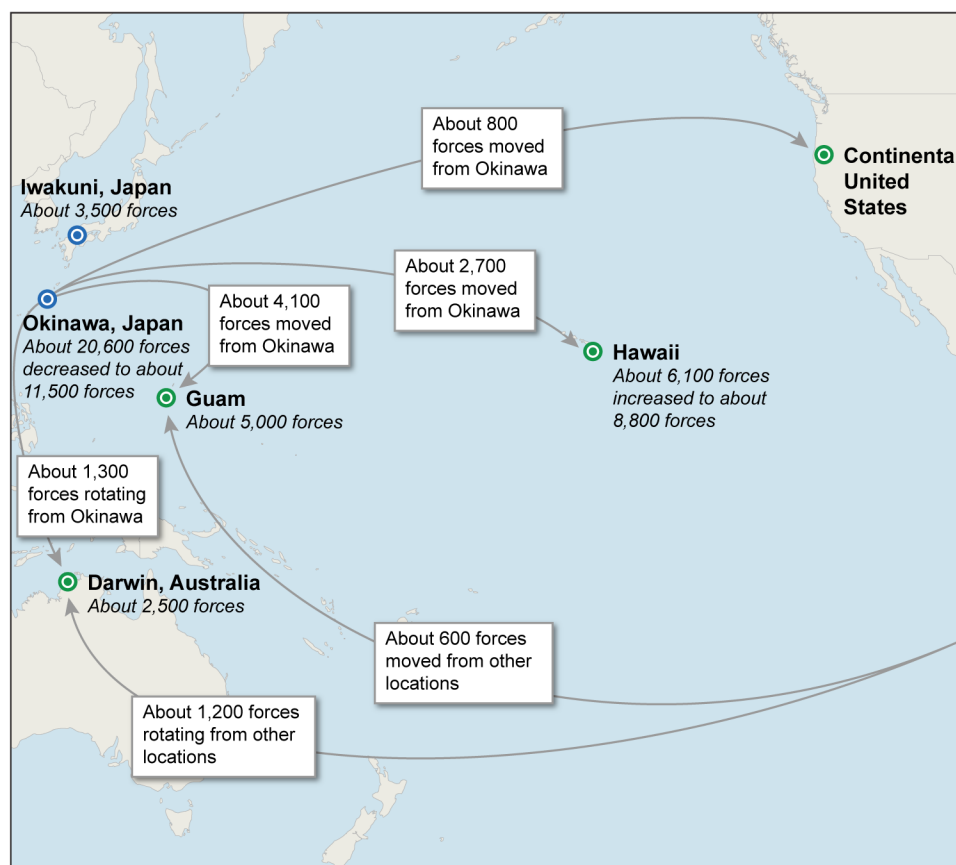
Line (inset) shows how high landfill material must rise to build the runway for the Futenma Replacement Facility. GAO extended the line to show the impact of building the runway on surrounding facilities and the nearby bay. The Marine Corps estimates requiring approximately 400 acres of landfill and 20 million cubic meters of earthwork.

Source: GAO. | GAO-17-415

Relocating Marine Corps Units from Okinawa to Guam, Hawaii, the Continental United States, and Australia

After several years of planning to move approximately 8,000 Marines from Okinawa to Guam, DOD revised its plan in April 2012 to, among other things, relocate 4,100 Marines to Guam, 2,700 to Hawaii, and 800 to the continental United States, as shown below in figure 2. Additionally, the plan includes establishing up to a 2,500-person rotational Marine Corps presence in Australia, 1,300 of whom would come from Okinawa—a move that, according to DOD officials, stems from a November 2011 announcement between the United States and Australia.

Figure 2: Planned Redistribution of Marine Corps Forces in the Asia-Pacific Region



Source: Marine Corps (data); Map Resources (map). | GAO-17-415

Note: According to Marine Corps documentation, approximately 9,100 forces are leaving Okinawa, but the plans only show the distribution of 8,900 of those forces. Officials note that all numbers may not add up due to approximation of the number of moving forces.

DOD expects relocation to Guam to occur between fiscal years 2022 and 2026. To provide additional training opportunities for Pacific Command's

service components, DOD is planning to construct training ranges on the nearby Commonwealth of the Northern Mariana Islands (CNMI), specifically the islands of Tinian and Pagan. However, no forces are expected to relocate to CNMI. DOD estimates that the total cost to relocate Marines to Guam and training on CNMI will be \$8.7 billion in fiscal year 2012 dollars, with approximately \$3.1 billion being provided by Japan.²⁰

DOD expects relocation to Hawaii to occur between 2027 and 2031. According to DOD documentation, its baseline rough order-of-magnitude cost estimates for development on Hawaii range from approximately \$1.3 billion to \$2.5 billion in fiscal year 2012 dollars, although actual costs will vary depending upon the mix of units and the facilities needed.

For the relocation to the continental United States, the Marine Corps currently has no plans, time frames, or cost estimates. According to Marine Corps officials, the decision to relocate 800 Marines to the continental United States was made because there was a need to further reduce the Marine Corps presence on Okinawa. Additionally, senior officials at Marine Corps Headquarters and Marine Corps Pacific Command stated there was no strategic need to move the Marines to the continental United States, and they assume that this move may never happen—for example, they said that if the global Marine Corps presence continues to downsize, then perhaps the positions for the 800 Marines slated to move to the continental United States may be eliminated from the global Marine Corps presence.

Additionally, in November 2011, the U.S. and Australian governments announced the intent to establish a rotational presence of up to a 2,500 person Marine Air-Ground Task Force in Darwin, Australia—1,300 of

²⁰Under a 2009 agreement implementing the 2006 Roadmap, the government of Japan had agreed to provide up to \$2.8 billion in fiscal year 2008 dollars in direct cash contributions to support the Guam relocation, subject to certain U.S. funding. See Agreement Concerning the Implementation of the Relocation of III Marine Expeditionary Force Personnel and Their Dependents from Okinawa to Guam, U.S.-Japan, art. I, ¶ 1, Feb. 17, 2009, T.I.A.S. No. 09-519. In its April 2012 statement, the Security Consultative Committee reaffirmed that Japan's financial commitment would be these direct cash contributions. An October 2013 protocol amended the preamble to the 2009 agreement to note that the contributions would amount to roughly \$3.1 billion in fiscal year 2012 dollars.

Consolidating Installations on
Okinawa

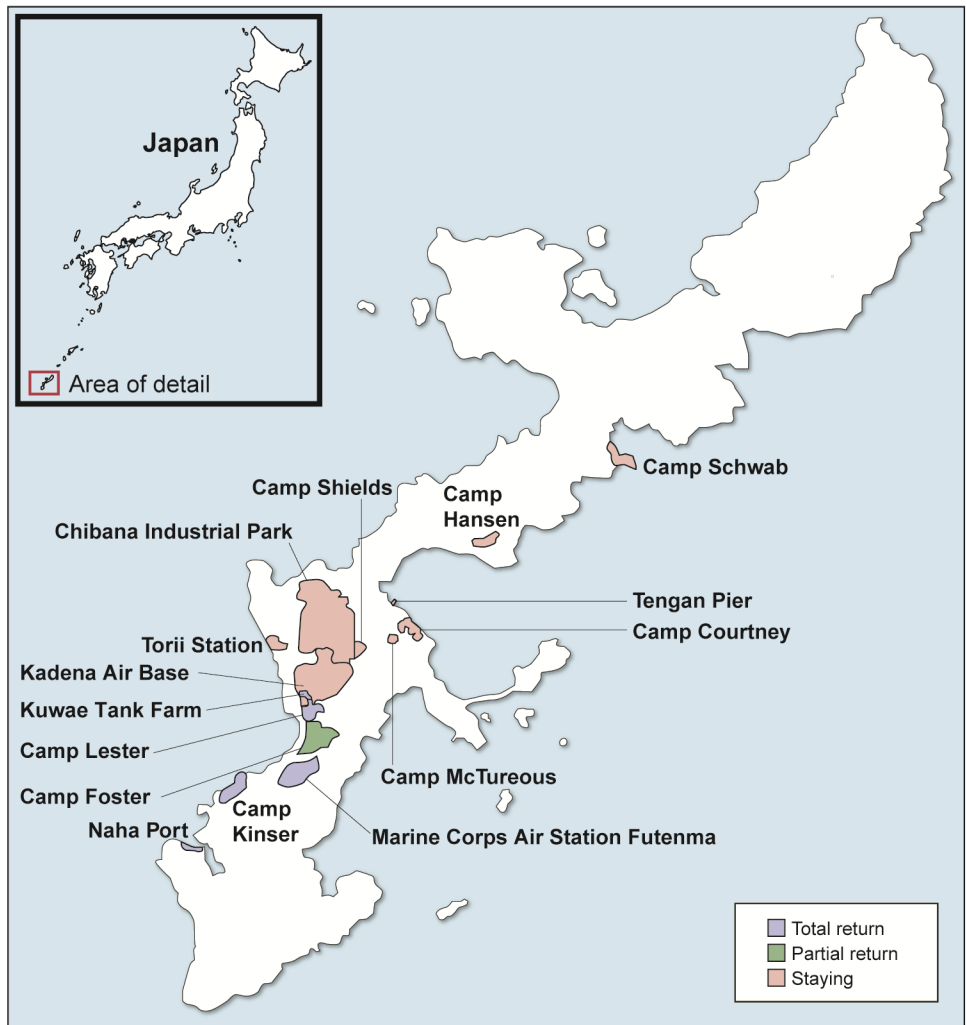
which would come from Okinawa, according to DOD.²¹ Rotations would occur from approximately April through September or October, during Australia's dry season. To date the Marine Corps has held five 6-month rotations, ranging from a 200 Marine infantry company rotation in 2012 to a 1,250 Marine infantry battalion rotation in 2016.

The April 2012 statement noted that the United States is committed to returning lands on Okinawa to Japan as designated Marine Corps forces are relocated and as facilities become available for units and other tenant activities relocating to other locations on Okinawa.²² Figure 3 depicts U.S. installations on Okinawa and identifies which installations have been designated to be partially or fully returned to Japan or are staying as part of the U.S. presence, according to the April 2012 statement.

²¹Specifically designed for swift deployment of Marine forces by air, land, or sea, the Marine Air-Ground Task Force provides a broad spectrum of response options when the nation's interests are threatened. Coordinating a balanced team of ground, air, and logistics assets under a central command, these self-sustained, combined-arms forces conduct the full range of operations. Marine Air-Ground Task Forces can be tailored in size and capability to meet the needs of each mission.

²²The facilities that would be fully returned to Japan are Marine Corps Air Station Futenma, Camp Kinser, Naha Port, Kuwae Tank Farm, and Camp Lester. Camp Foster would be partially returned.

Figure 3: Okinawa Consolidation Plan



Source: Department of Defense (data); Map Resources (map). | GAO-17-415

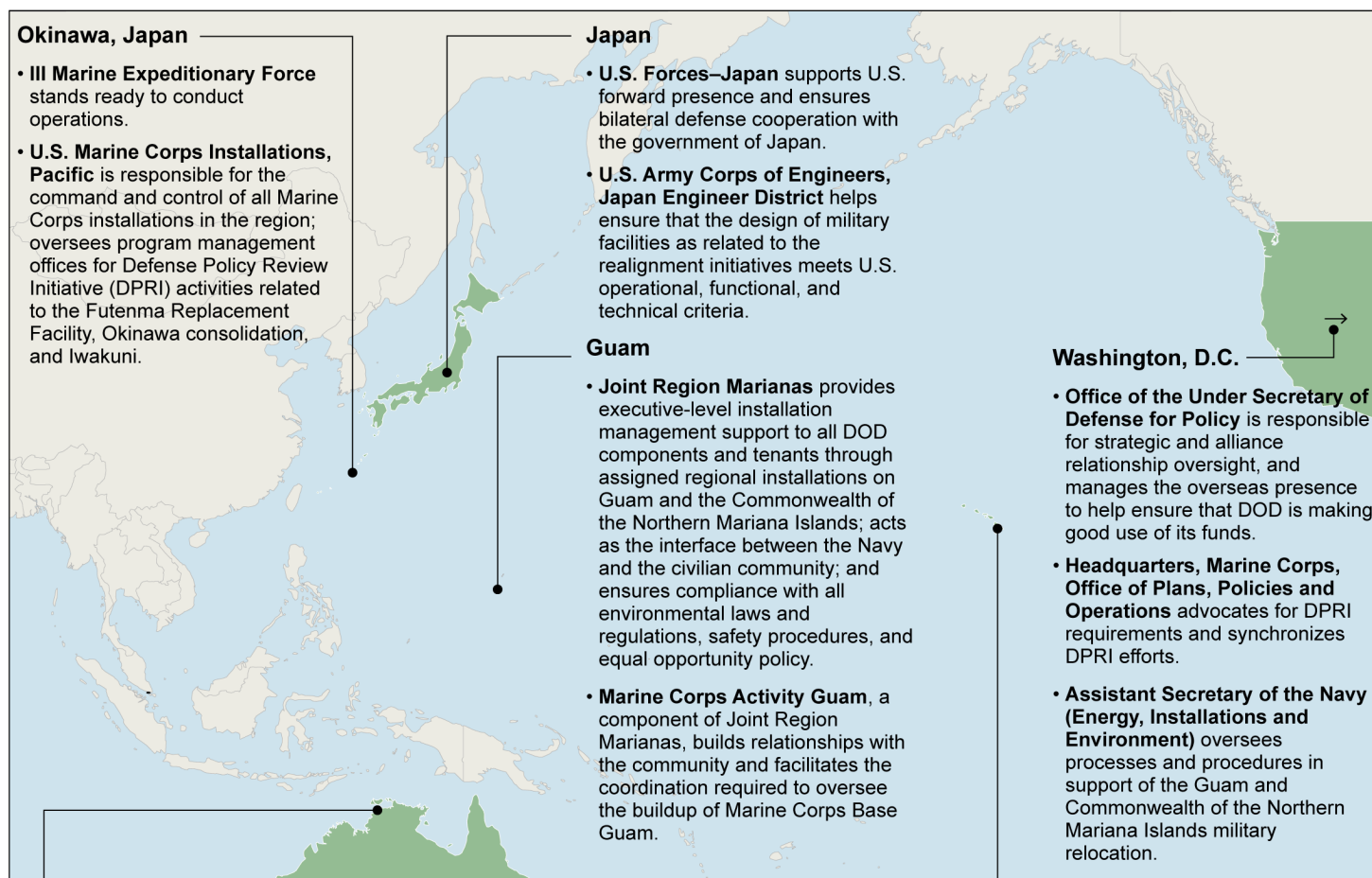
Moving Marines to Iwakuni

On the basis of the 2006 Roadmap, the Marine Corps would relocate its tanker aircraft and facilities from Marine Corps Air Station Futenma to Marine Corps Air Station Iwakuni, as well as develop a training capability at Kanoya Air Base. Additionally, a Navy carrier wing currently located at Naval Air Station Atsugi (about 35 miles southwest of Tokyo, Japan) would relocate to Marine Corps Air Station Iwakuni. The relocation to Iwakuni is expected to be completed in 2019, with the Marine Corps tanker aircraft unit having already relocated in 2014.

DOD Roles and Responsibilities for the Asia-Pacific Relocation

Within DOD, several offices have roles in the relocation of Marines from Okinawa to Guam and Hawaii, the establishment of a rotational Marine presence in Australia, and the realignment of Marines within Okinawa and Iwakuni. These offices are located throughout the United States and Pacific Command's area of responsibility. Figure 4 identifies DOD offices with roles and responsibilities related to the Asia-Pacific relocation, along with their locations.

Figure 4: Department of Defense Offices with Roles in the Asia-Pacific Relocation, and Their Locations



Darwin, Australia

- **Marine Rotational Force – Darwin** conducts exercises and training on a rotational basis with the Australian Defence Force for about 6 months of the year.

Oahu, Hawaii

- **Pacific Command and its components** are responsible for the service components' actions and missions within the Pacific Command area of responsibility.
- **Naval Facilities Engineering Command Pacific** provides the design and construction of military facilities as related to the realignment initiatives.
- **U.S. Army Corps of Engineers, Pacific Ocean Division** helps ensure that the design of military facilities as related to the realignment initiatives meets U.S. operational, functional, and technical criteria.

Source: GAO analysis of Department of Defense (DOD) information; Map Resources (map). | GAO-17-415

DOD Has Coordinated Its Efforts for Relocating Marines from Okinawa but Has Not Fully Resolved Selected Identified Capability Deficiencies

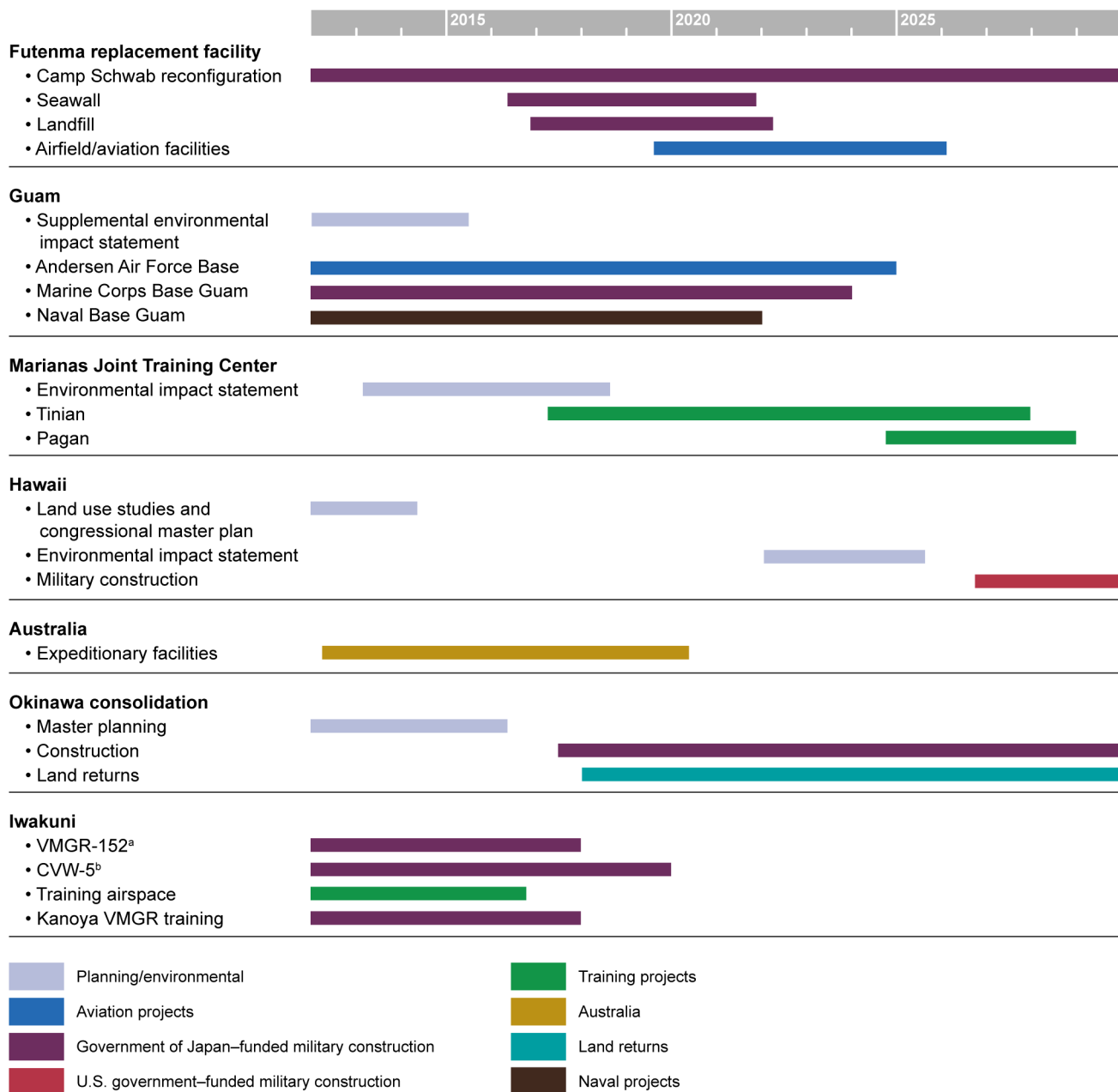
DOD has coordinated its efforts to relocate Marines from Okinawa by developing a high-level synchronization plan that combines the various programs related to relocating Marines from Okinawa and organizing various working groups to increase coordination among stakeholders. However, DOD officials have not fully resolved selected identified capability deficiencies associated with the planned relocation to Guam and Hawaii and establishment of a rotational presence in Australia.

DOD Has Coordinated Its Efforts to Relocate Marines from Okinawa by Developing a High-Level Synchronization Plan and Organizing Working Groups

The Marine Corps has coordinated its efforts to relocate Marines from Okinawa by developing a high-level synchronization plan that combines the programs related to relocating Marines in one document. Headquarters Marine Corps officials described the synchronization plan as an overarching tool for simultaneously scheduling the various relocation initiatives and graphically depicting how these relocations are interconnected and affected by both unit movements and facilities construction. In June 2013, we reported that this synchronization plan was in development, with the goal of establishing the appropriate sequencing of events needed to complete all relocation initiatives.²³ In January 2015, the Marine Corps completed the synchronization plan, which contains information pertaining to the Futenma Replacement Facility, Guam, the Joint Training Range Complex in CNMI, Hawaii, Australia, Okinawa consolidation, and Iwakuni. Subsequently, in June 2016 the Marine Corps updated the synchronization plan to incorporate its latest time frames. Figure 5 shows how major milestones and actions may interface with each other, up to 2030.

²³[GAO-13-360](#).

Figure 5: Milestones Reflected in the Marine Corps Synchronization Matrix for the Asia-Pacific Relocation up to 2030



Source: Marine Corps. | GAO-17-415

^aVMGR-152 is the Marine Aerial Refueler Transport Squadron, which relocated from Okinawa to Iwakuni, Japan.

^bCVW-5 is Carrier Air Wing Five, which is relocating from Atsugi to Iwakuni, Japan.

In addition, DOD has coordinated relocation initiatives through organizing various working groups that bring together representatives from the respective stakeholders involved in the relocation efforts. For example, U.S. Forces—Japan participates in several working groups called Alliance Transformation Ad-Hoc Working Groups and subcommittees that address DPRI. One group works on Okinawa initiatives, which includes all topics related to Okinawa Consolidation and the Futenma Replacement Facility. Another group addresses progress in mainland Japan with Marine Corps Air Station Iwakuni and Kanoya Air Base. Pacific Command officials said they also participate in several working groups such as the Joint Facilities Working Group and the DPRI Planning Group. The officials stated that the Joint Facilities Working Group is led by Pacific Command and consists of the Office of the Secretary of Defense and representatives from each of the services, including Naval Facilities Engineering Command, and their Australian counterparts. They added that this group plans facilities and is working on resolving cost estimate differences for Australia. The DPRI Planning Group includes participants from Marine Corps offices including Marine Corps Plans, Policies and Operations; Marine Corps Installations Command; Marine Corps Forces Pacific; Marine Corps Activity Guam; and III Marine Expeditionary Force.²⁴ The group is responsible for developing and submitting all requirements for the future Marine Corps Base Guam.

DOD Has Not Fully Resolved Selected Identified Capability Deficiencies Associated with the Planned Relocation

DOD has not yet fully resolved selected identified capability deficiencies related to the relocation of Marines from Okinawa, which may cause units to be unprepared or not fully prepared for their missions. Specifically, DOD has not fully resolved the operational challenges related to moving Marine units to Guam; limited training facilities in Iwakuni, Hawaii, and CNMI; the runway length at the Futenma Replacement Facility; and challenges for operating in Australia. According to DOD's Unified Facilities Criteria 2-100-01, in the context of developing installation master plans, mission requirements—which would include the capabilities needed to fulfill the mission—largely determine land and facility support requirements.²⁵ This DOD guidance states that data on current and

²⁴The III Marine Expeditionary Force is a formation of multiple Marine units forward-deployed in Japan and Asia to support the Treaty of Mutual Cooperation and Security between the United States and Japan, and other alliance relationships of the United States. It is able to deploy rapidly and conduct operations across the spectrum from humanitarian assistance and disaster relief to amphibious assault and high-intensity combat.

²⁵DOD, Unified Facilities Criteria 2-100-01, *Installation Master Planning* (May 15, 2012).

Operational Challenges Related to Moving Marine Corps Forces

proposed mission requirements will be used to establish limitations and conditions that directly affect the installation's ability to execute mission support. However, DOD began planning facility requirements before resolving selected identified capability deficiencies that can affect the missions of the relocating units, and it has not yet resolved needed capabilities for the Marine Corps units that will be relocated as part of the realignment in the Asia-Pacific region.

DOD has not resolved operational challenges associated with the movement of Marine Corps units before beginning to develop facility requirements. Officials with III Marine Expeditionary Force stated that they began working on capability planning in January 2013, after being given the facilities plan for Guam. As a result of working on capability planning after facility planning, III Marine Expeditionary Force officials identified several capability concerns regarding the relocation. For example, III Marine Expeditionary Force officials stated they would like the Guam relocation to occur within an 18-month time frame to help ensure that forces move together based on capabilities. According to officials from III Marine Expeditionary Force, it makes more sense to move a maintenance battalion at the same time it moves the units the battalion supports rather than move that battalion based on facility completion dates; otherwise, the supported units would remain in Okinawa for some time without maintenance capability. Marine Corps and Pacific Command officials stated that, based on the capability concerns regarding the relocation expressed by III Marine Expeditionary Force, in the summers of 2015 and 2016 Marine Corps Forces Pacific conducted simulated wartime scenarios to assess these capability concerns. As a result of the simulated wartime scenarios, the Marine Corps and Pacific Command officials stated that some of III Marine Expeditionary Force's concerns were validated and proposed solutions are currently being analyzed. However, the analysis on how to move forces has not yet been resolved, and the officials said that decisions need to be made about force structure and positioning of forces to affect facility planning adjustments. According to DOD's Unified Facilities Criteria 2-100-01, mission requirements will be used to largely determine land and facility support requirements. Instead, DOD has focused on facility planning before capability planning. By considering options to resolve this capability deficiency, such as striking the balance between moving forces together based on capabilities with not leaving facilities vacant, DOD could help ensure that mission requirements are being met and are not hindered during the relocation.

Limited Training Facilities in Iwakuni, Hawaii, and CNMI

DOD has not fully resolved some identified Marine Corps training capability deficiencies in Iwakuni, Hawaii, and CNMI. As a result, it may take additional time, effort, and resources to resolve these deficiencies and it is uncertain whether the Marine Corps units will be able to complete necessary training in these locations.

- **Iwakuni**—DOD has not fully resolved training requirements needed for the Marine Corps units that relocated from Okinawa to Marine Corps Air Station Iwakuni. According to officials from U.S. Forces–Japan, there are no training locations near Iwakuni that are sufficient for relocated Marine Corps units’ training needs, resulting in the units returning to Okinawa for training and spending additional money for fuel and equipment maintenance. Kanoya Air Base is currently the only location that is being considered for training, but it is not sufficient for the relocated units’ needs because there are training requirements that cannot be satisfied at Kanoya Air Base, according to U.S. Forces–Japan and Marine Corps officials. DOD has formed a working group to consider training in mainland Japan for Iwakuni units, but planning has stalled because DOD has not identified other training areas. Although, according to officials from U.S. Forces–Japan, the government of Japan is ultimately generally responsible for building training locations, DOD’s identification of other training areas could be presented to the government of Japan to help resolve this issue, in particular given that DOD may ultimately be responsible for sustaining whatever training facility the government of Japan builds. DOD could also continue to raise the concern about the training deficiency in normal bilateral channels such as the Security Consultative Committee. With respect to training capacity, as indicated by Unified Facilities Criteria 2-100-01, DOD has identified limitations and conditions that affect the Iwakuni installation’s ability to execute mission support. However, it has not identified other training areas that would support mission requirements. Marine Corps officials stated that, as of October 2016, the bilateral arrangement with Japan was modified to allow for alternative training areas other than Kanoya Air Base. However, Marine Corps officials did not provide evidence that any further locations have been identified. In February 2017, officials from U.S. Forces–Japan said that bilateral consensus was reached on an agreement to establish a working group to study other possible locations beyond Kanoya for training. Without identifying training areas for its units based in Iwakuni, DOD risks having spent significant resources in expanding the Marine Corps Air Station Iwakuni while still spending additional time and money sending units back to Okinawa.

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- **Hawaii**—DOD has not resolved the training needs of the approximately 2,700 additional Marines that are planned to relocate to Hawaii beginning in 2027. The addition of the Marines will likely cause additional strain on already stressed training ranges in Hawaii. As of April 2016, Marine Corps officials have not identified a timeline for when they plan to develop training plans, stating that planning for Hawaii is not yet a priority. However, citing a March 2014 Hawaiian islands training study, Marine Corps officials noted that installations in Hawaii lack sufficient range capabilities to fully support training of units already stationed there.²⁶ Because the sites are not sufficient, the officials stated that about 90 percent of the Marine Corps training occurs on Army training ranges in Hawaii. However, there are capacity issues with those sites because the Marine Corps has to share the space with the Army. According to the March 2014 study, the limited ranges in Hawaii have historically been used at a close-to-capacity level. Furthermore, infrastructure planning takes years to complete in advance of allocating resources for particular needs in a budget. Without infrastructure planning to support mission requirements, as identified in the Unified Facilities Criteria 2-100-01, the Marine Corps risks not having the necessary infrastructure to fulfill its needed capabilities. It is important to resolve this capability deficiency now because these training issues will become exacerbated as additional Marines begin to relocate to Hawaii.
 - **CNMI**—DOD has not fully resolved the training requirements in the region of CNMI, and may have to spend more time and resources to identify other, potentially more costly, locations for training. According to DOD's study on training requirements in CNMI, there are 42 unfilled training requirements throughout Pacific Command's area of responsibility.²⁷ DOD officials stated that training ranges in CNMI would solve all of the unfulfilled live-fire and unit-level training deficiencies in the Asia-Pacific region. Pacific Command officials described the potential training capabilities in CNMI as a crucial initiative. However, as of the time of our review, the environmental impact statement recommending training ranges in CNMI has not

²⁶Department of Defense, *United States Marine Corps Hawaiian Islands Range and Training Requirements, Capabilities Analysis, and Alternatives Feasibility Study* (March 2014).

²⁷Department of the Navy, *CNMI Joint Military Training Requirements and Siting Study* (2013).

been finalized, and instead it is being revised.²⁸ The draft environmental impact statement received 27,000 comments expressing concerns about the plans regarding training facilities in CNMI. Many of these comments expressed concerns about potential impacts on water, wastewater, and public health. In order to address the multitude of comments, the Department of the Navy stated it is conducting a revised study. While some DOD officials offered hypothetical alternatives for training in CNMI, such as training in foreign countries, they have not yet conducted any specific planning and stated that there are no Pacific-based alternatives to consider on U.S. territories. Rather, DOD officials stated that fulfillment of any of the 42 unfilled training requirements through the training ranges in CNMI would be an improvement, and they could plan for alternatives once they determine if any requirements will remain unfulfilled. Until the training issue is resolved, DOD may have to spend more time and resources to identify other, potentially more costly, locations for training Marines relocated to Guam.

Reduction in Runway Length at the Futenma Replacement Facility

DOD has not fully resolved the capability deficiency of the planned runway at Camp Schwab, which will replace the 9,000-foot runway at Marine Corps Air Station Futenma but will be shorter. Mission operations at Marine Corps Air Station Futenma support operations involving a variety of fixed-wing, rotary-wing, and tilt-rotor aircraft. Marine Corps Air Station Futenma also supports the use of a runway if needed for a United Nations contingency, such as disaster response, for which U.S. Forces–Japan is a key partner. The proposed runway at Camp Schwab will not adequately support these same mission requirements, according to Marine Corps officials. Instead, there will be two 5,900-foot V-shaped runways that, according to Marine Corps officials, will be too short for certain aircraft. As we reported in March 1998 and is still the case based on our discussions with Marine Corps officials, the loss of Marine Corps

²⁸Under the National Environmental Policy Act of 1969, codified as amended at 42 U.S.C. §§ 4321–4347, and implementing regulations, federal agencies must assess the effects of major federal actions that significantly affect the quality of the human environment. The human environment includes the natural and physical environment and the relationship of people with that environment. 40 C.F.R. § 1508.14. In certain circumstances, an agency must develop an environmental impact statement, which provides a full and fair discussion of significant environmental impacts and informs decision makers and the public of reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. See 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1502.1, 1502.3. The proposed action for CNMI is to establish a series of live-fire ranges, training courses, and maneuver areas within CNMI to reduce existing joint service training deficiencies and meet the Pacific Command service components' unfilled unit-level and combined-level training requirements in the Western Pacific.

Air Station Futenma's runway equates to the loss of an emergency landing strip for fixed-wing aircraft in the area and the loss of the United Nations use of a runway.²⁹ According to an official from the Office of the Under Secretary of Defense for Policy, the office has not yet developed a plan for other alternate runways in Okinawa because it is not a priority. Although it does not yet have a plan for other alternate runways in Okinawa, DOD did take an initial step in April 2014 when it sent a letter to the government of Japan seeking approval for bilateral site surveys for locations that could support contingency operations. While a good first step, this letter did not specifically focus on other alternatives in Okinawa—only 1 of the 12 options was located in Okinawa, and some suggested alternatives were located over 1,500 miles away. Moreover, not all of the site surveys have been completed, and Marine Corps and U.S. Forces–Japan officials we spoke with stated that the need remained for alternate runways to be identified.

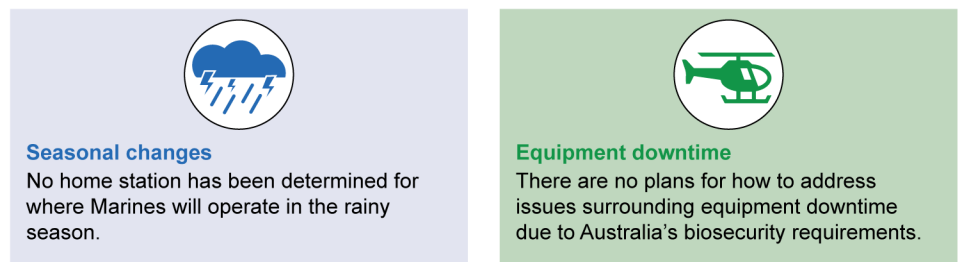
As indicated by Unified Facilities Criteria 2-100-01, DOD has identified limitations and conditions that affect Camp Schwab's installation's ability to execute mission support with respect to the runway. Although Marine Corps and Pacific Command officials said the government of Japan is ultimately responsible for replacing the lost requirements by providing a longer runway elsewhere, DOD could be identifying other runways in Okinawa that would support mission requirements, which it could present to the government of Japan to help resolve this issue. By planning to construct a runway at Camp Schwab that does not have the needed capabilities, and until the site surveys are completed and an alternate runway is selected to replace those needed capabilities, DOD risks not supporting needed mission requirements and the issue remains unresolved.

Challenges for Operating in Australia

DOD has not resolved challenges related to the rotation of Marines to Australia, including seasonal changes (i.e., where to operate in the rainy season) and equipment downtime that will likely affect capabilities and increase costs (see fig. 6).

²⁹[GAO/NSIAD-98-66](#).

Figure 6: The Department of Defense's Challenges for Operating in Australia



Source: GAO analysis of Department of Defense information. | GAO-17-415

DOD has not resolved where Marine units will be stationed during the rainy season (November to April) because, according to Office of the Under Secretary of Defense for Policy and Marine Corps officials, it is still early in the planning process and those plans are not yet a priority. Flooding during the rainy season is a significant issue in the Darwin area, as seen in figure 7. Presently, some of the rotational force is returning to Okinawa, but they will need to find a new location as the Marine Corps presence on Okinawa is reduced. DOD officials are considering multiple options for the Marines' location during the rainy season, but no decisions have been made, and the options being considered will take years to implement. Without infrastructure planning to support mission requirements, as identified in the Unified Facilities Criteria 2-100-01, the Marine Corps risks not having the necessary infrastructure to fulfill its needed capabilities. By not resolving this capability deficiency now, DOD does not know what the financial or operational consequences will be for this decision, and decision makers in DOD and Congress cannot plan accordingly to help ensure sufficient funding is in place to support the operational and facility requirements of that location.

Figure 7: Flooding in Australia's Bradshaw Field Training Area during the Rainy Season



Source: Department of Defense. | GAO-17-415

Moreover, DOD has not resolved what to do about the government of Australia's biosecurity requirements that affect equipment downtime. According to officials at Pacific Command, the biosecurity requirements could result in some Marine Corps equipment being nonoperational for approximately 2 months out of the 6-month rotation. DOD documentation discusses Australian biosecurity requirements regarding weeds, pests, and diseases. According to government of Australia and DOD officials, equipment that enters Australia is subject to inspection and cleaning due to the country's biosecurity requirements. Marine Corps officials stated that, during the approximately 2 months it generally takes to break down, clean, and reassemble the Marine Corps equipment, the equipment is not functional and this hinders capability and training. Officials with the Office of the Under Secretary of Defense for Policy stated that the biosecurity requirements are a risk to the Marine Corps units' capability. Marine Corps officials stated that leaving a set of equipment in Australia is one option being considered to ease these requirements. However, according to a senior Pacific Command official and officials with III Marine

Expeditionary Force, this is an expensive option and also requires a location for the equipment to be stored. Pacific Command and Marine Corps officials stated that the Marine Corps has identified an additional equipment set that could be left in Australia to minimize biosecurity inspection requirements, but challenges remain to fund and source this equipment. Unified Facilities Criteria 2-100-01 identifies that DOD should plan its infrastructure needs to support mission requirements. By not resolving the selected identified capability deficiencies associated with equipment downtime prior to operating in Australia, the Marine Corps risks not having the equipment needed to conduct its mission since, depending on the course of action, it could take years to allocate resources to mitigate this issue.

As of December 2016, DOD has not resolved selected identified capability deficiencies in the four areas noted above. According to Office of the Under Secretary of Defense for Policy and Marine Corps officials, some of these deficiencies have not been resolved because it is still early in the planning process. Even though the relocation of Marines from Okinawa to other locations is years away, this does not preclude DOD from taking action to resolve selected capability deficiencies in the identified four areas. It is important to resolve these identified capability deficiencies in the near term because it can take many years to plan, allocate resources, and develop facilities. If DOD does not resolve the identified capability deficiencies in these four areas, the Marine Corps may be unable to maintain its capabilities or face much higher costs to do so.

DOD Has Taken Steps to Develop Infrastructure Plans and Schedules for Its Relocation but Did Not Develop a Reliable Schedule for Guam and Has Not Completed Risk Planning in Guam and Okinawa

DOD has taken steps to develop infrastructure plans and schedules for the proposed locations for the relocation of Marines from Okinawa; however, we found that the Marine Corps' schedule for Guam did not meet the characteristics of a reliable schedule identified in the GAO *Schedule Assessment Guide*. With respect to risk planning, the Navy plans to establish an office to address coordination and communication of risks associated with its infrastructure planning in CNMI, but the Marine Corps has not completed risk planning for its construction efforts in Guam, and the Navy has completed limited planning for sustainment of infrastructure in Okinawa.

DOD Has Taken Steps to Develop Its Infrastructure Plans for Guam, CNMI, Japan, Hawaii, and the Rotational Presence in Australia

DOD has taken steps to develop infrastructure plans for relocations to Guam, CNMI, Japan, Hawaii, and the rotational presence of Marines in Australia. In Guam, CNMI, and Japan, DOD developed plans that identified alternatives for its infrastructure in each location, such as the development of base configuration and environmental analyses. Moreover, DOD has developed plans for infrastructure requirements that will support the planned relocation to Hawaii and rotational presence of Marines in Australia.

Guam

DOD has developed plans that outline the base configuration and environmental impacts of the infrastructure that will support the relocation of Marines to Guam. In June 2014, the Navy developed a master plan, which is a plan that outlines the infrastructure configuration, requirements, and construction sequence, for the relocation to Guam.³⁰ In July 2015, the Navy conducted an analysis that outlined the environmental impacts of

³⁰Department of the Navy, *Fiscal Year 2014 National Defense Authorization Act Section 2822 Master Plan for Guam* (June 13, 2014). Naval Facilities Engineering Command, Pacific, developed this master plan to meet a requirement in section 2822 of the National Defense Authorization Act for Fiscal Year 2014. Section 2822 prohibited the obligation of funds to implement the realignment of Marine Corps forces from Okinawa to Guam or Hawaii until DOD submitted, among other things, a master plan for the construction of facilities and infrastructure to execute the Marine Corps distributed lay-down on Guam, including a detailed description of costs and the schedule for such construction. See Pub. L. No. 113-66, § 2822(a)(2) (2013).

the relocation to Guam, issuing a final supplemental environmental impact statement, which changed the location of military family housing in Guam from the location identified in the master plan, specifically from the Naval Base Guam Telecommunications Site Finegayan to Andersen Air Force Base.³¹ DOD officials told us they expect this alternative to be cheaper than the initial proposal since DOD will be constructing military family housing using existing utilities.³² In addition, DOD officials stated that this alternative would reduce the impact on endangered species and thus the need for environmental mitigation and the costs associated with it.

CNMI

In April 2015, the Navy released a draft environmental impact statement to the public that identified its preferred alternative for live-fire training ranges on Tinian and Pagan, two islands that are a part of a chain that make up CNMI.³³ The draft environmental impact statement received more than 27,000 comments from the people and government of CNMI. DOD officials stated that the people and the government of CNMI had expressed concerns over the potential effect on public infrastructure on

³¹Department of the Navy, *Final Supplemental Environmental Impact Statement: Guam and Commonwealth of the Northern Mariana Islands Military Relocation (2012 Roadmap Adjustments)* (July 2015). A supplemental environmental impact statement is a supplement to an existing environmental impact statement, conducted when the agency makes substantial changes in its proposed action or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The Navy prepared the supplemental environmental impact statement to address infrastructure related to the establishment of a cantonment area, family housing, a live-fire training range complex, and associated infrastructure to support the relocation of a substantially reduced number of Marines and dependents. The Navy announced its intention to proceed with the Final Supplemental Environmental Impact Statement preferred alternatives in an August 2015 Record of Decision.

³²In [GAO-13-360](#), we found that DOD had not accounted for the relocation of Marines in its housing plans for Guam and recommended that the Navy conduct an economic analysis of family housing alternatives in Guam to support the relocation of Marines to Guam. The Navy addressed this recommendation with a housing market analysis that established a baseline for long-term military family housing requirements in Guam. See Department of Defense, *2012 Housing Requirements Market Analysis Update: U.S. Naval Base Guam, Andersen Air Force Base, and U.S. Marine Corps Base, Guam* (September 2013). The Navy incorporated information on military family housing from the housing market analysis into its master plan.

³³Department of the Navy, *Draft Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement and Overseas Environmental Impact Statement* (April 2015). The draft environmental impact statement analyzed alternatives in the islands of Tinian and Pagan that could support a series of live-fire ranges, training courses, and maneuver areas, known as the Commonwealth of the Northern Mariana Islands Joint Military Training, to meet training requirements in the Pacific.

Tinian and cultural sites on Pagan. According to Navy officials, they have tentative plans to release a revised draft environmental impact statement in November 2017 that takes into account the concerns raised by the people and the government of CNMI, with the final environmental impact statement expected in April 2019. However, DOD officials added that this date could change if DOD determines it needs to conduct additional studies.

Japan

DOD has taken steps to complete infrastructure plans in Japan, including developing bilateral plans and master plans for the infrastructure related to the Marine realignment. In April 2013, the United States and the government of Japan released a bilateral plan for the consolidation of infrastructure in Okinawa related to the Marine realignment, which identified the land areas that DOD plans to return to Okinawa, general time frames for those returns, and the sequence of steps that will need to occur to facilitate those returns.³⁴ According to Marine Corps officials, they had plans to update the bilateral plan with additional details before the end of 2016, including potential updates to dates for land returns in Okinawa. Officials with the Office of the Under Secretary of Defense for Policy stated that U.S. Forces–Japan began talks with the government of Japan in late 2016 about revising the bilateral plan, but as of January 2017 there was no combined work product or documentation. In preparing for the various Asia-Pacific realignment activities, DOD has also developed master plans that identified its development strategy to meet Okinawa consolidation objectives.³⁵

Hawaii and Australia

DOD has developed some initial infrastructure requirement plans for both Hawaii and Australia. DOD officials told us that they prioritized planning for Guam over planning for Hawaii or Australia, as DOD is using money from the government of Japan for the relocation to Guam. In preparation for future master plans and environmental analyses, DOD has developed some initial infrastructure assessments for the relocation of Marines to

³⁴Department of Defense, *U.S.-Japan Okinawa Consolidation Plan* (Apr. 5, 2013).

³⁵Department of the Navy, *Marine Corps Base Camp Butler Master Plan, Volume 5: Plan Summary* (December 2015). This plan included all Marine Corps bases on Okinawa, except for the sustainment of Marine Corps Air Station Futenma and the Futenma Replacement Facility. Instead, the Department of the Navy completed separate master plans for these two locations. See Department of the Navy, *Marine Corps Base Camp Butler Master Plan, Volume 2: Marine Corps Air Station Futenma Sustainment Plan* (December 2015). Also, see Department of the Navy, *Futenma Replacement Facility: Bilateral Master Plan* (Mar. 7, 2014). Marine Corps officials expect changes to the Futenma Replacement Facility plan due to continued delays on that facility.

Hawaii and for expanded rotations to Australia. In December 2014, the Navy completed a siting plan for Hawaii, which provided an analysis of opportunities for future growth of existing installations and new construction on DOD-owned land in Hawaii that would support a Marine relocation.³⁶ Marine Corps officials plan to use the Hawaii siting plan as a starting point for the development of future infrastructure plans. Additionally, DOD has completed two infrastructure studies that identify Marine Corps' requirements for housing and for aircraft support for an expansion of Marine rotations in Darwin, Australia.³⁷ Moreover, DOD officials told us that they began developing a master plan for the infrastructure that will support Marine rotations to Australia.

³⁶Department of the Navy, *Hawaii Distributed Laydown Feasibility Siting Plan* (Dec. 2, 2014).

³⁷See Department of Defense, *Royal Australian Air Force Base Darwin, Joint Aircraft Beddown Feasibility Study – Charette Report* (Feb. 2015). This planning document summarizes initial planning efforts concerning potential infrastructure related to aircraft parking for Marine Corps and Air Force aircraft. See DOD, *Robertson Barracks Bi-Lateral Beddown Feasibility Study: Final Report* (Jan. 2016). This planning document summarizes initial planning efforts concerning infrastructure such as living accommodations, mess halls, fitness facilities, and administrative facilities.

The Marine Corps Has Begun Developing Schedules for Its Infrastructure in Japan and Guam, but Its Schedule for Infrastructure in Guam Is Not Reliable

The Marine Corps has taken steps to develop integrated master schedules—schedules used for planning, executing, and tracking the status of a program—for the realignment efforts in Japan and relocation to Guam. The Marine Corps is developing master schedules for its realignment activities in Okinawa; hence, we did not evaluate the reliability of these schedules.³⁸ We also did not assess the reliability of the integrated master schedule for Marine Corps Air Station Iwakuni because most of the construction projects for this base had already begun. In reviewing the Marine Corps' integrated master schedule for Guam from July 2016, we found that the schedule does not meet all of the characteristics of a reliable schedule—comprehensive, well-constructed, credible, and controlled—identified as best practices in the GAO *Schedule Assessment Guide*.³⁹ A reliable schedule allows program management to decide between possible sequences of activities, determine the flexibility of the schedule according to available resources, predict the consequences of managerial action or inaction in events, and allocate contingency plans to mitigate risk. Further, the success of a program depends in part on having an integrated and reliable master schedule that defines when and how long work will occur and how each activity is related to the others.

³⁸Marine Corps officials stated that they have begun developing integrated master schedules for realignment activities associated with relocations to Marine Corps Air Station Iwakuni and the Futenma Replacement Facility and the consolidation of infrastructure in Okinawa. The Marine Corps' integrated master schedule for Marine Corps Air Station Iwakuni has guided the construction effort there. Marine Corps officials told us that they had developed lessons learned related to the integrated master schedule, such as a need for more time in the integrated master schedule for furnishing its infrastructure and constructing communication infrastructure at the conclusion of each project. Further, Marine Corps officials stated that when they developed the integrated master schedule for the Futenma Replacement Facility, they applied some of those lessons learned to this schedule by incorporating longer time frames for those tasks into specific project time frames. According to Marine Corps officials, they have started developing but have not completed an integrated master schedule for the consolidation of infrastructure in Okinawa. As of December 2016, Marine Corps officials stated the integrated master schedule for Okinawa consolidation has a master plan that is pending approval. We did not assess the integrated master schedules for Okinawa Consolidation because, at the time of our review, it was not yet developed. We did not assess the integrated master schedule for the Futenma Replacement Facility because, at the time of our review, officials said the schedule was subject to changes based on ongoing legal issues with the government of Japan.

³⁹Department of the Navy, *Guam Integrated Master Schedule*, ver. 1.0 (July 2016). See also [GAO-16-89G](#).

Our analysis found that the Marine Corps' integrated master schedule is not reliable as it did not substantially or fully meet all four of the GAO *Schedule Assessment Guide's* characteristics for a reliable schedule. If any of the characteristics are not met, minimally met, or partially met, then the schedule cannot be considered reliable. We found the integrated master schedule substantially met one of the four characteristics for a reliable schedule, partially met two characteristics, and minimally met one characteristic; see table 1, below.⁴⁰

⁴⁰For a more-detailed table outlining the analysis, see app. III.

Table 1: Summary Assessment of the Marine Corps' Integrated Master Schedule for Guam Compared to Characteristics for Reliable Schedules

Integrated master schedule characteristics and comments	Our assessment
<p>1. Comprehensive: A schedule that is comprehensive should capture all activities, assign resources to all activities, and establish the duration of all activities.^a</p> <p>The Marine Corps' integrated master schedule reflects the activities for the program, and the Marine Corps updates the integrated master schedule with resource and duration information summarized from lower-level project schedules; however, not all activities in the integrated master schedule are supported by lower-level project schedules that fully identify resources. Further, the Marine Corps does not document what estimation techniques it uses to calculate the duration of activities in the schedule.</p>	Partially met
<p>2. Well-Constructed: A schedule that is well-constructed should have sequencing for all activities, a valid critical path, and a reasonable total float.^b</p> <p>The Marine Corps updated its integrated master schedule in response to our initial assessment that activities had constraints that negatively affected the critical path. This update addressed some of those constraints; however, the schedule's activities have other constraints that prevented the Marine Corps from calculating accurate end dates for the program's critical paths and determining the program's flexibility.</p>	Partially met
<p>3. Credible: A schedule that is credible should be horizontally and vertically traceable and should have a schedule risk assessment.^c</p> <p>The integrated master schedule has lower levels of the schedule summarized in higher levels of the schedule, but the schedule has constraints that prevent activities from updating other related activities in the schedule. Further, the Marine Corps has not conducted a schedule risk assessment.</p>	Minimally met
<p>4. Controlled: A schedule that is controlled is updated using actual progress and logic, and has a baseline schedule.^d</p> <p>Officials stated that the Marine Corps has a policy to update the schedule each month. Additionally, the Marine Corps has developed a baseline schedule for the program.</p>	Substantially met

Source: GAO analysis of Marine Corps information. | GAO-17-415

Note: For this analysis, we had five assessment categories: not met (provided no evidence that satisfies any of the criterion), minimally met (provided evidence that satisfies a small portion of the criterion), partially met (provided evidence that satisfies about half of the criterion), substantially met (provided evidence that satisfies a large portion of the criterion), and fully met (provided complete evidence that satisfies the entire criterion). A schedule is considered reliable if the schedule substantially or fully meets all four characteristics of a reliable schedule.

^aFor a schedule, the duration refers to the estimated time to complete an activity, specifically between the start and end dates.

^bA critical path is the path of longest duration through a sequence of activities; specifically, it helps a program determine which activities are critical to achieving a project's earliest possible completion date. Total float is the amount of time an activity can be delayed before that delay affects the program's estimated completion date.

^cA schedule is horizontally traceable if the schedule has program elements that are linked to one another through straightforward logic, including activities and program milestones. A schedule is vertically traceable if the lower-level and higher-level schedules are consistent with one another. A risk assessment is a part of the program's overall risk management process in which risks are identified and analyzed and the program's risk exposure is determined. As risks are identified, program management develops risk-management plans and incorporates those plans into the program's schedule, as necessary.

^dA baseline schedule outlines the target schedule for a program, including the program's scope, the period for accomplishing it, and the required resources.

According to Marine Corps officials, the integrated master schedule is an enterprise-level summary of resource and duration information from lower-level project schedules. Officials stated that contractors identify resources for construction activities in project schedules that the Marine Corps uses to update the integrated master schedule. However, a lower-level construction schedule examined was not fully resource loaded; in addition, the integrated master schedule includes a majority of activities unrelated to construction efforts, such as information technology and design activities. According to the GAO *Schedule Assessment Guide*, a schedule should reflect all resources necessary to complete the program to help ensure the program can use the schedule to make important management decisions, such as the reallocation of resources between projects.⁴¹ Because the reliability of an integrated schedule depends in part on the reliability of its subordinate schedules, schedule quality weaknesses—including lack of resource information—in these schedules will transfer to an integrated master schedule derived from them. If the integrated master schedule is unreliable and includes, for example, unjustified date constraints and inaccurate critical paths to key milestones, DOD may not have reliable information on potential sources of delays to support the relocation of Marines to Guam. Further, DOD may not have a reliable schedule to assess progress, identify potential problems, and promote accountability for the relocation to Guam.

DOD Has Taken Steps to Conduct Risk Planning for Infrastructure in CNMI but Has Not Completed Its Risk Planning in Guam and Okinawa

The Navy has taken steps to conduct risk planning for infrastructure in CNMI by establishing an office to help coordinate and communicate its infrastructure efforts. However, the Marine Corps has not completed risk planning for the construction of infrastructure in Guam through the completion of a risk-management plan, and the Navy has completed limited planning for sustainment of infrastructure in Okinawa in its master plan. Infrastructure risk planning for each location—CNMI, Guam, and Okinawa—is unique and at different stages, thus necessitating different actions and approaches by DOD.

⁴¹[GAO-16-89G](#).

Establishment of an Office to Plan for Risks to Infrastructure in CNMI

In October 2016, the Navy began establishing an office to plan for risks to proposed infrastructure in CNMI, specifically related to plans for live-fire training ranges on the islands of Tinian and Pagan.⁴² The Navy, which oversees the environmental analyses that will precede infrastructure construction in CNMI, released a draft environmental impact statement in April 2015 that discussed potential alternatives for the configuration of the live-fire training.⁴³ However, the Navy is revising that draft environmental impact statement, due to concerns from the people and government of CNMI regarding the effects of the ranges on Tinian and Pagan. According to DOD officials, the concerns include the potential effects on public infrastructure in Tinian and cultural sites on Pagan. In May 2016, the Navy proposed establishing an office located on the island of Saipan in CNMI to facilitate coordination and communication between DOD and the people and government of CNMI, so that it can help address risks related to environmental impact, land acquisition, and cultural sensitivities. In October 2016, Navy officials told us they hired an individual to supervise the office in Saipan and that they have identified a physical office space. Further, Navy officials stated that they plan to hire additional staff for the office in Saipan to assist with coordination and communication with the people and government of CNMI.

Limited Risk Planning for Identified Construction Risks in Guam

Marine Corps officials have conducted limited risk planning and have not completed a risk-management plan that identifies a strategy to address construction risks that may affect the cost and schedule for infrastructure in Guam. Specifically, DOD has identified risks, including construction labor shortages, explosive ordnance detection, cultural artifact discovery and preservation, and endangered-species protection, which can affect the cost or the schedule for each of the various individual projects on the island. DOD manages these risks on a project-by-project basis; however, DOD officials acknowledged that construction risks may become challenging to address as the Marine Corps begins to manage more ongoing construction projects. As of July 2016, the Marine Corps had four construction projects under way, but it will be initiating significantly more construction projects beginning in fiscal year 2018. Specifically, the Marine Corps identified that it will have 15 active construction projects in

⁴²These live-fire training ranges will address training deficiencies in the Pacific and specifically the Mariana region. Currently, the Mariana region has the most training deficiencies of any region within the Pacific Command area of responsibility.

⁴³Department of the Navy, *Draft Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement and Overseas Environmental Impact Statement*.

fiscal year 2018 and will increase the number of construction projects each year until fiscal year 2021 when the Marine Corps will peak at 43 active construction projects. Further, Marine Corps officials have not completed a risk-management plan that identifies a strategy for collectively addressing construction risks on Guam. A risk-management plan is a document that outlines the service's approach to identify, analyze, handle, and monitor risks across a program. Therefore, while the Marine Corps manages risks on a project-by-project basis, the Marine Corps has not identified its strategy for the collective impact of risks to infrastructure resulting from an increase in construction projects.

The following are examples of construction risks that may affect the relocation of Marines to Guam:

- **Construction labor shortage:** DOD officials identified that there is a risk of a construction labor shortage that may affect their ability to meet the labor demand necessary for the increase in construction projects. Specifically, the Navy expects that construction contractors will need to supplement their labor workforce with 2,800 foreign laborers to meet the demand for labor during the peak of construction. According to Navy and government of Guam officials, construction contractors on Guam have experienced challenges in getting approvals for H-2B visas to fill skilled labor gaps.⁴⁴ According to data from the Guam Department of Labor, U.S. Citizenship and Immigration Services approved approximately 4 percent of H-2B visa applications for Guam between January and September 2016. According to government of Guam officials, the approval percentage for H-2B visas is significantly lower than the percentage in fiscal years 2014 and 2015, when the U.S. Citizenship and Immigration Services approved over 98 percent of H-2B visa applications for Guam. Navy

⁴⁴According to the Guam Department of Labor, Guam relies on the H-2B visa program to fill critical skilled labor gaps. Generally, an H-2B classification applies to an alien who is coming temporarily to the United States to perform nonagricultural work of a temporary or seasonal nature, if there are not sufficient workers who are able, willing, qualified, and available at the time of application and at the place where the alien is to perform such services or labor. See 8 C.F.R. § 214.2(h)(1)(ii)(D). Before filing a petition with U.S. Citizenship and Immigration Services, an employer must apply for a temporary labor certification with the Department of Labor or, in the Territory of Guam, with the Governor of Guam. See, e.g., § 214.2(h)(6)(iii)-(v). Additional certification and conditions may be required in the context of military construction. See Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Pub. L. No. 110-417, § 2824(c)(6) (2008), as amended (10 U.S.C. § 2687 note). Currently, according to the Guam Department of Labor, Guam uses these visas to meet the demand for construction labor.

officials stated that challenges in getting approval for foreign labor applications will in turn affect DOD's ability to meet the construction labor demand for the increase in projects in fiscal year 2018.

- **Explosive-ordnance detection:** According to DOD officials, there is a risk of cost overruns or schedule delays related to the process for the detection of explosive ordnance on construction worksites. Navy officials stated that they account for cost and schedule implications related to the detection of explosive ordnance when the Navy solicits bids for projects from contractors; however, DOD officials told us that they frequently discover anomalies, such as tin cans or scrap metal, when detecting for explosive ordnance. In one instance, Navy officials stated that they had to modify the contract for a utilities project that resulted in a \$4.9 million cost increase and a 10-month schedule delay because the contractor detected more anomalies that DOD had to address than predicted in the initial contract.

In May 2016, the Office of the Chief of Naval Operations issued an exemption to aspects of the Navy's guidance on the detection of explosive ordnance in an attempt to ease standards that resulted in cost overruns and schedule delays in Guam.⁴⁵ Under the exemption, civilian construction labor does not need to evacuate a site during the detection process for explosive ordnance in certain circumstances. DOD officials stated that the exemption reduced some of the cost and schedule risks related to detecting explosive ordnance, but the current process for the detection of explosive ordnance may still affect the cost and schedule for a project. Figure 8 illustrates an example of the detection and removal of explosive ordnance at a utilities project in Guam.

⁴⁵Department of the Navy, *Modification of Chief of Naval Operations Explosives Safety Exemption E1-16A for Commander, Joint Region Marianas*. (Washington, D.C.: May 9, 2016).

Figure 8: Explosive-Ordnance Detection and Removal at a Utilities Project in Guam



Removal of unexploded ordnance from a Guam construction site.

Source: Navy. | GAO-17-415



Discovered unexploded ordnance from a Guam construction site.

- **Cultural-artifact discovery and preservation:** DOD discovery and preservation of cultural artifacts following the initiation of a project can affect that project's cost and schedule. According to DOD officials, they plan for potential costs and time needed for artifact discovery and preservation in the construction contracts for particular projects, but there may be additional costs or schedule delays after they discover artifacts on construction sites. For example, the Marine Corps has plans to build a live-fire training range on the northwest end of Guam that may require the discovery and preservation of artifacts on 21 sites that, according to the Navy, are eligible for listing on the National Register of Historic Places, which may result in additional costs or schedule delays.⁴⁶ Navy officials noted that they have taken steps to streamline the documentation of its artifact discovery and preservation process in preparation for each site, but they expect challenges in meeting cultural-artifact discovery and preservation requirements. Figure 9 shows examples of artifacts discovered during construction at various DOD sites in Guam.

⁴⁶The National Register of Historic Places is the official list of the historic places in the United States identified for historical preservation.

Figure 9: Cultural Artifacts Discovered during Construction at Various Department of Defense Sites, Guam



A grinding stone discovered on Naval Base Guam Telecommunications Site Finegayan. These mortars were used to prepare food.



The Department of Defense discovered an indigenous artifact on a Navy property.

Source: Navy. | GAO-17-415

- **Endangered-species protection:** According to the Navy, DOD has experienced schedule delays as it has waited for the Fish and Wildlife Service to complete biological opinions that outline protection strategies for endangered species located in construction areas. For example, DOD experienced delays on two construction projects due to the discovery of endangered orchid and butterfly species on site, which, according to the Navy, has caused delays in awarding the contracts for both construction projects.

The Marine Corps has not completed its risk-management plan for Guam infrastructure. In October 2015, the Marine Corps began developing its risk-management plan, defining roles and responsibilities for risk planning efforts in Guam. Based on our review of the draft risk-management plan—which has been included in the Guam program management plan—we found that the Marine Corps has not identified a strategy within its risk-management plan to address the four risks identified above for infrastructure in Guam, among other construction risks. Officials from the Marine Corps stated that risk is consistently assessed at multiple levels and managed through biweekly coordination meetings with all stakeholders. However, while risks may be assessed on a project-by-project basis, Marine Corps officials have not completed in the draft risk-

Limited Risk Planning for
Sustainment of Infrastructure in
Okinawa Related to the
Realignment

management plan a strategy to collectively address construction risks on Guam. Officials from Pacific Command expect the identification of specific risks, assessments, and mitigations to be included in a risk assessment tool to be purchased for the Guam program. DOD guidance notes that risk management is integral to effective program management.⁴⁷ Moreover, the guidance indicates that a risk-management plan should be developed early in a program's formulation and notes that the plan should document an integrated approach for managing risks.

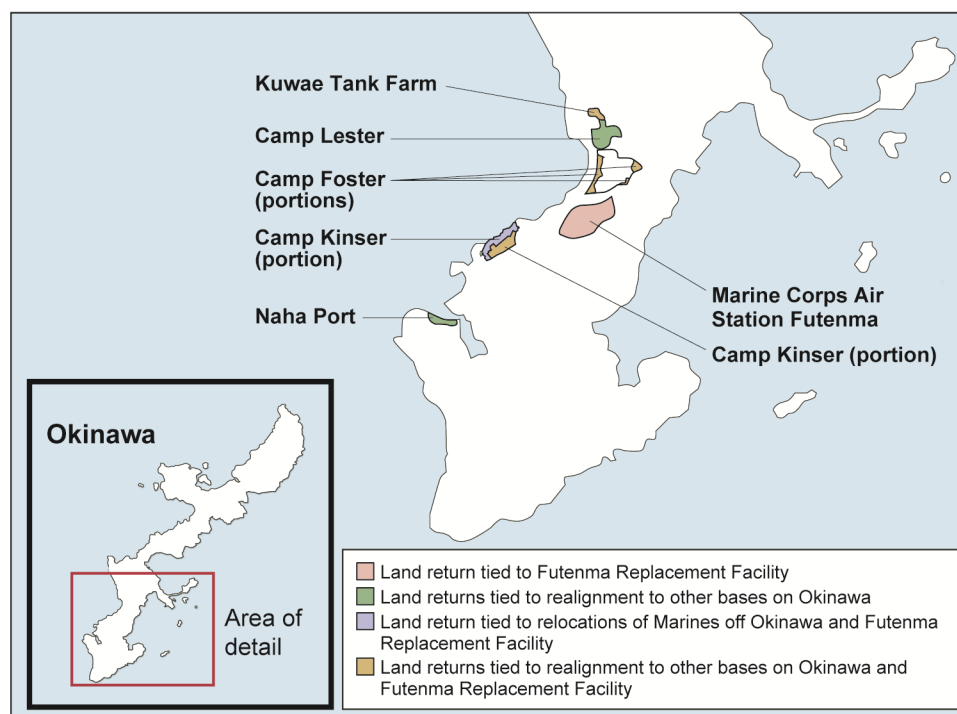
Any schedule delays to the construction of infrastructure in Guam may have broader effects on other locations involved in the Asia-Pacific realignment. For example, DOD may need to support infrastructure in Okinawa for a longer period and at additional costs if risks are not planned for adequately. Without a risk-management plan that identifies the Marine Corps' strategy for addressing risks to the infrastructure buildup in Guam, DOD may not have complete information to address risks to the design and construction of its infrastructure that may result in cost overruns and schedule delays related to the relocation of Marines.

DOD has completed limited risk planning for the sustainment of infrastructure in Okinawa by developing a master plan.⁴⁸ However, DOD did not identify its short- or long-term sustainment needs for the Marine Corps' infrastructure in its master plan. Figure 10 shows the infrastructure DOD identified that will require sustainment while it waits on various relocation activities to take place.

⁴⁷Department of Defense, *DOD Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs* (Washington, D.C.: June 2015). Although this guidance is specific to the defense acquisition context, officials from Navy's Guam Program Management Office stated that they will base the risk-management plan on principles found within it. While the Marine Corps began developing the plan using an older version of this guidance from August 2006, Marine Corps officials stated that they plan on adjusting the plan to the current guidance when they complete development of this plan.

⁴⁸Department of the Navy, *Marine Corps Base Camp Butler Master Plan, Volume 5: Plan Summary*.

Figure 10: Okinawa Bases That the Department of Defense Identified Will Require Sustainment While It Waits on Relocation Activities



Source: Department of Defense (data); Map Resources (map). | GAO-17-415

In June 2013, we found that DOD had not developed master plans that included sustainment plans for the majority of the infrastructure on Okinawa it would need while waiting on other, related Asia-Pacific realignment activities to take place.⁴⁹ Therefore, we recommended that DOD update its master plans to include sustainment requirements and costs for its infrastructure on Okinawa, including short-term and long-term sustainment needs to account for uncertainty regarding the time needed to complete realignment activities. In December 2015, the Navy developed a master plan for the Marine Corps infrastructure on Okinawa. However, the Navy did not identify in the master plan short- or long-term needs to account for uncertainty regarding the time needed to complete related realignment activities as we recommended. Not identifying in the master plan short- or long-term sustainment needs puts DOD at risk of not having the information necessary to make informed decisions about

⁴⁹GAO-13-360.

maintaining its infrastructure at an acceptable level to carry out its mission. DOD guidance on real property management requires DOD components to develop master plans for installations that outline their annual construction plans for at least a 10-year period and to update the master plan at least every 5 years. Furthermore, the guidance requires that DOD components include a specific, annual listing of major repair and sustainment projects.⁵⁰ In addition, Unified Facilities Criteria guidance regarding installation master planning indicates that installation planning and programming staff must capture facility requirements and propose solutions to meet those requirements from the options available.⁵¹ Therefore, we continue to believe that fully implementing our June 2013 recommendation to update Okinawa installation master plans to include short- or long-term sustainment needs is important to aid DOD in obtaining sufficient information to make prudent investment decisions for infrastructure sustainment in Okinawa.

DOD Has Made Progress in Developing Its Infrastructure Cost Estimates for Guam, Hawaii, and Australia but Its Estimates Partially Met Best Practices for a Reliable Cost Estimate

⁵⁰ See Department of Defense Instruction 4165.70, *Real Property Management*, paras. 6.1.3, 6.1.4, 6.1.5 (Apr. 6, 2005).

⁵¹ See DOD, Unified Facilities Criteria 2-100-01, *Installation Master Planning*, para. 2-11.1 (May 15, 2012).

DOD Has Made Progress in Developing Its Cost Estimates for Guam but Partially Met Best Practices for a Reliable Cost Estimate

DOD improved its cost estimates for Guam since our June 2013 report by adding a documented technical baseline description and clear documentation of ground rules and assumptions for its military construction cost estimates, and including life-cycle costs for its nonmilitary construction cost estimates.⁵² However, we found that DOD's updated cost estimates partially met the best practices for a reliable cost estimate.⁵³ According to GAO's *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, a cost estimate is considered reliable if it fully or substantially meets the best practices of all four characteristics: comprehensive, well-documented, accurate, and credible (see fig. 11).⁵⁴ In addition, Office of Management and Budget guidance from July 2016 containing best practices states that credible cost estimates are vital for sound management decision making and for any program to succeed.⁵⁵

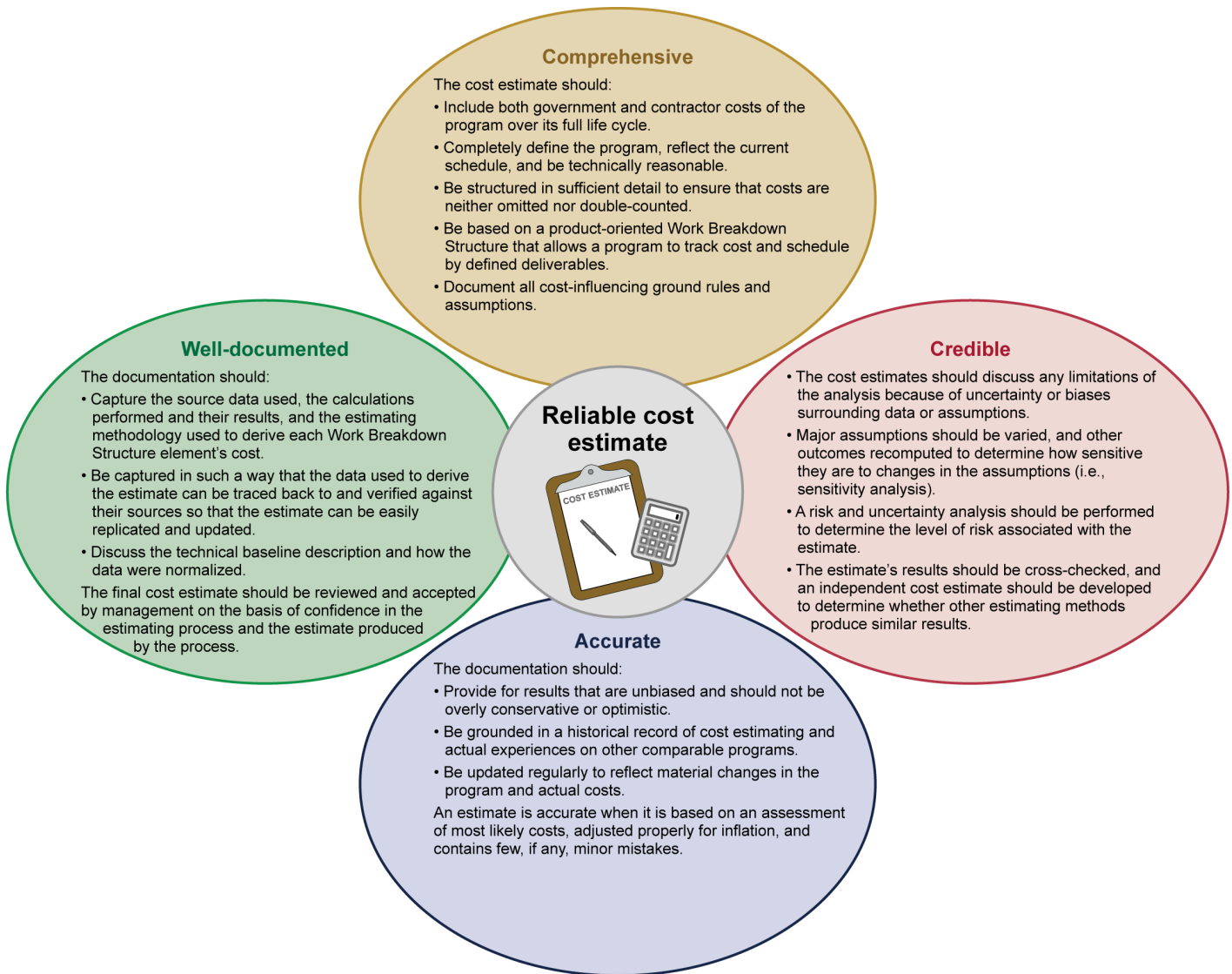
⁵²GAO-13-360. When GAO reviewed DOD's preliminary cost estimate for the realignment plan in June 2013, we reported that it only minimally met best practices for being comprehensive and thus could not fully meet the other characteristics of a reliable cost estimate. Therefore, we did not assess DOD's cost estimate against the best practices for the well-documented, accurate, and credible characteristics of a reliable cost estimate. We recommended that DOD update its estimate with comprehensive cost estimates that had seven identified cost components, including Guam physical layout and requirements, requirements to upgrade utilities and infrastructure on Guam, and Guam housing requirements. Since then, DOD has further developed cost estimates for Guam to include these requirements, and we were able to compare DOD's cost estimates for Guam to the best practices of all four characteristics of a reliable cost estimate.

⁵³DOD officials identified three cost estimates that constitute the total cost estimate for infrastructure in Guam: military construction costs, enduring costs (i.e., operation and maintenance associated with sustaining facilities once they have been built), and nonenduring costs (i.e., onetime operation and maintenance costs associated with setting up the facilities, but not military construction). To evaluate these estimates, we completed two analyses: (1) military construction costs and (2) nonmilitary construction costs, which include nonenduring costs (onetime costs not associated with military construction) and enduring costs (the costs of operating and maintaining the facilities once they have been constructed).

⁵⁴GAO-09-3SP.

⁵⁵Office of Management and Budget, *Capital Programming Guide: Supplement to OMB Circular A-11: Planning, Budgeting, and Acquisition of Capital Assets*, app. 8, ver. 3.0 (July 2016). The Office of Management and Budget guidance references GAO's *Cost Estimating and Assessment Guide* and notes that the appendix on cost estimating is based on GAO's guide.

Figure 11: Four Characteristics of a Reliable Cost Estimate



Source: GAO. | GAO-17-415

To assess DOD's cost estimates for infrastructure in Guam, we compared DOD's cost estimates for both military construction and nonmilitary construction activities to the best practices of the four characteristics of a reliable cost estimate. We assessed each best practice as not met, minimally met, partially met, substantially met, or fully met. We found that the cost estimates for military construction activities in Guam substantially met best practices for the comprehensive, well-documented, and

accurate characteristics but minimally met best practices for the credible characteristic. In addition, we found that the cost estimates for nonmilitary construction activities in Guam partially met best practices for the comprehensive and accurate characteristics, and minimally met best practices for the well-documented and credible characteristics. Appendix IV includes our detailed assessment of DOD's military construction and nonmilitary construction cost estimates for Guam regarding each of the best practices for the four characteristics for reliable cost estimates, including the reasons best practices were not fully met. Table 2 provides a summary of our assessment, for each of the four characteristics, of DOD's military construction and nonmilitary construction cost estimates for Guam.

Table 2: Summary of GAO's Assessment of DOD's Relocation Cost Estimates for Guam Compared to Characteristics for Reliable Cost Estimates

Characteristic	Assessment summary	GAO's assessment
Comprehensive	Military construction: substantially met	The estimate documentation includes ground rules, assumptions, and a product-oriented Work Breakdown Structure and is based on an approved technical baseline. ^a While the Guam rainbow chart includes a summary of non-enduring and military construction costs, the total life-cycle costs are not captured.
	Nonmilitary construction: partially met	The Guam Master Plan provides a high-level planning overview of the requirements for plan implementation; however, there is no document that currently includes enduring costs or fully describes the requirements for the nonenduring costs. There is no unifying Work Breakdown Structure that aligns the Guam Rainbow Chart to the schedule or the cost estimates. ^b
Well-documented	Military construction: substantially met	The cost elements are documented on DD Form 1391s and with basis-of-estimate documents. ^c The documentation shows the source data, the methodology, and the type of inflation used, but does not address the reliability of the data.
	Nonmilitary construction: minimally met	Two of the underlying estimates had some documentation regarding how the estimates were developed as part of their estimating models. However, there is a varying level of documentation of the requirements in the underlying cost estimates. In the combined enduring and non-enduring workbooks, there is no mention regarding the source information for any of the data or discussion of data normalization aside from adjusting the underlying cost estimates for inflation. ^d There is no document that describes the steps performed to develop the Guam effort's costs.
Accurate	Military construction: substantially met	There are no mathematical errors and inflation adjustments are made appropriately. The Guam Rainbow Chart is updated approximately once a year in August and the cost workbooks are updated approximately once per month. Actual costs are tracked by management; however, individual cost estimates will not be updated with the actual costs until the effort has been completed.
	Nonmilitary construction: partially met	DOD has begun to assess the risks associated with the cost estimate; however, DOD did not perform the analysis to determine the full effect of the risks on the Guam effort's total cost. The details of the source data are not apparent in all of the estimates.

Characteristic	Assessment summary	GAO's assessment
Credible	Military construction: minimally met	An independent review was conducted that examined the completeness of the estimate. However, no independent cost estimate was completed. The estimate does not include a risk or sensitivity analysis. There is no evidence that cross-checking was performed.
	Nonmilitary construction: minimally met	Some of the underlying estimates use other means to account for risk, and an independent review was conducted that examined the completeness of the estimate. However, the estimate does not include a risk or sensitivity analysis. There is no evidence that cross-checking was performed. No independent cost estimate was completed.

Source: GAO analysis of Department of Defense (DOD) cost estimate data. | GAO-17-415

Note: For this analysis, we had five assessment categories: not met—provided no evidence that satisfies any of the criterion; minimally met—provided evidence that satisfies a small portion of the criterion; partially met—provided evidence that satisfies about half of the criterion; substantially met—provided evidence that satisfies a large portion of the criterion; and fully met—provided complete evidence that satisfies the entire criterion. A cost estimate is considered reliable if it fully or substantially meets all four characteristics of a reliable cost estimate.

^aA Work Breakdown Structure defines in detail the work necessary to accomplish a program's objectives. It reflects the program requirements and provides a basis for identifying resources and tasks for developing a program cost estimate.

^bThe Guam Rainbow Chart is a program management tool that summarizes detailed program inputs and traces the schedule and dollar value of the tasks included as part of the DOD \$8.7 billion cap for the relocation to Guam and the Commonwealth of the Northern Mariana Islands. Subject to certain exceptions and adjustments, the total amount DOD may obligate or expend from funds available for military construction for implementation of the Record of Decision for relocation of Marine Corps forces to Guam was limited by the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 to approximately \$8.7 billion. See Pub. L. No. 113-291, § 2821(a) (2014).

^cDD Form 1391 is used by DOD to submit to Congress requirements and justification in support of funding requests for military construction.

^dThe purpose of data normalization is to make a given data set consistent with and comparable to other data used in the estimate. Since data can be gathered from a variety of sources, they are often in many different forms and need to be adjusted before being used for comparison analysis or as a basis for projecting future costs.

DOD officials acknowledged that their cost estimates for Guam did not include all best practices for reliable cost estimates. For example, officials stated that they did not include a unifying Work Breakdown Structure for the estimates for nonmilitary construction because they do not complete a Work Breakdown Structure at the programming stage. However, according to the GAO cost estimating guide, the Work Breakdown Structure should be set up when the program is established and should become successively detailed over time, as it provides a basic framework for estimating costs, determining where risks may occur, and measuring program status. Further, officials stated that they did not resource the level of effort to conduct a risk or sensitivity analysis for the estimates for military and nonmilitary construction because it is not warranted. The GAO cost estimating guide states that a risk analysis and a sensitivity analysis are part of every high-quality cost estimate, as a risk analysis

captures the cumulative effect of additional risk and a sensitivity analysis helps mitigate uncertainty by explaining how changes to key assumptions and inputs affect the estimate. In addition, officials stated that an independent cost estimate was performed for the estimates for nonmilitary construction. However, we reviewed DOD's documentation and found that what they identified as an independent cost estimate was actually a review of a cost summary. The GAO cost estimating guide states that an independent cost estimate should be completed as it provides an independent view of expected program costs that tests the estimate for reasonableness.

Without a revision of cost estimates for Guam to include all of the best practices established by GAO's cost estimating guide, including a Work Breakdown Structure, risk and sensitivity analyses, and an independent cost estimate, decision makers in DOD and Congress will not have reliable cost information to inform their funding decisions regarding infrastructure for the Marine Corps relocation to Guam.

DOD Partially Met Best Practices for Comprehensiveness in Its Cost Estimates for Infrastructure in Hawaii and Australia

DOD partially met the comprehensive characteristic for a reliable cost estimate for its planned infrastructure for Hawaii and Australia by documenting ground rules and assumptions associated with the military construction costs.⁵⁶ However, DOD did not include other best practices established by the GAO cost estimating guide for the comprehensive characteristic, such as having all life-cycle costs or a Work Breakdown Structure in its cost estimates. Since the efforts for Hawaii and Australia are still early in the planning process, we did not evaluate the DOD cost estimates for infrastructure in Hawaii and Australia against the best practices for the other three characteristics of a reliable cost estimate.⁵⁷

⁵⁶When GAO reviewed DOD's preliminary cost estimate for the realignment plan in June 2013, we could not conduct an in-depth review of the cost estimates for the relocation of Marines to Hawaii and establishment of a rotational Marine presence in Australia because they were not based on finalized plans or requirements. In December 2014, DOD completed a cost estimate for the relocation to Hawaii, and in February 2015 and January 2016, DOD completed two cost estimates for the establishment of a rotational presence in Australia. Thus, we are now able to conduct an in-depth review of the comprehensive characteristic for each cost estimate.

⁵⁷The files developed and provided by DOD are early in the acquisition life cycle (e.g., they are Rough Order of Magnitude estimates), and as such their information may be inadequate to support a full analysis. According to the GAO cost estimating guide, when a cost estimate is not comprehensive, it cannot fully meet the other characteristics of a reliable cost estimate, by definition.

Table 3 provides a summary of our assessment of DOD’s cost estimates. Appendix V includes our detailed assessment of DOD’s cost estimates for Hawaii and Australia, including the reasons that DOD’s cost estimates partially met GAO’s comprehensive characteristic.

Table 3: Summary of GAO’s Assessment of DOD’s Cost Estimates for Hawaii and Australia Compared to the Comprehensive Characteristic for Reliable Cost Estimates

Location	Assessment summary	GAO’s assessment
Hawaii	Partially met	The estimate is well organized and uses standardized military construction facility codes, but DOD has not developed a life-cycle cost estimate or a Work Breakdown Structure. ^a
Australia	Partially met	DOD’s feasibility studies for Australia contain ground rules and assumptions to explain the military construction costs. ^b However, DOD has not examined the life-cycle costs or developed a Work Breakdown Structure.

Source: GAO analysis of Department of Defense (DOD) data. | GAO-17-415

Note: For this analysis, we had five assessment categories: not met—provided no evidence that satisfies any of the criterion; minimally met—provided evidence that satisfies a small portion of the criterion; partially met—provided evidence that satisfies about half of the criterion; substantially met—provided evidence that satisfies a large portion of the criterion; and fully met—provided complete evidence that satisfies the entire criterion. A cost estimate is considered comprehensive if it fully or substantially meets the best practices.

^aA Work Breakdown Structure defines in detail the work necessary to accomplish a program’s objectives. It reflects the program requirements and provides a basis for identifying resources and tasks for developing a program cost estimate.

^bThe Marine Corps has completed two studies regarding the locations proposed to accommodate the Marine rotational presence (Royal Australian Air Force Base Darwin and Robertson Barracks).

According to the GAO cost estimating guide, in order for a cost estimate to be considered comprehensive, it should include government and contractor costs over the full life cycle of the program and the estimate should be based on a product-oriented Work Breakdown Structure that allows a program to track cost and schedule by defined deliverables, among other best practices.⁵⁸ In addition, DOD guidance on economic analysis for decision making indicates that, as part of assessing the costs and benefits of alternatives, an economic analysis should include

⁵⁸[GAO-09-3SP](#).

comprehensive estimates of the expected costs and benefits that are incident to achieving the stated objectives of the project.⁵⁹

DOD officials acknowledged that their cost estimates for Hawaii and Australia did not include all best practices, such as a life-cycle cost estimate and a Work Breakdown Structure, for the comprehensive characteristic because the planning for Hawaii and Australia is still in the early stages and the cost estimates will become more detailed as the planning progresses. A DOD official stated that DOD does not plan to develop a life-cycle cost estimate for Hawaii until at least fiscal year 2018 because DOD is focused on completing the Marine relocation to Guam before beginning detailed planning for Hawaii. Based on best practices in the GAO cost estimating guide, the life-cycle cost estimate for the relocation to Hawaii should be examined and understood early in the planning process regardless of other projects, as a life-cycle cost estimate enhances early decision making and enables planning studies to be evaluated on a total-cost basis. According to the GAO cost estimating guide, a life-cycle cost estimate can support budgetary decisions, key decision points, and investment decisions. Without fully accounting for life-cycle costs, management will have difficulty successfully planning program resource requirements and making informed decisions. In addition, the GAO cost estimating guide states that the Work Breakdown Structure should initially be set up when the program is established and should become successively detailed over time, as it provides a basic framework for estimating costs, determining where risks may occur, and measuring program status.⁶⁰ Without a Work Breakdown Structure, the program lacks a framework to develop a schedule and cost plan that can easily track resources spent and completion of activities and tasks.

Without a revision of cost estimates for Hawaii and Australia to include all of the best practices established by GAO's cost estimating guide for the comprehensive characteristic, decision makers in DOD and Congress will not have reliable cost information to inform their funding decisions regarding infrastructure for Hawaii and Australia and to help them

⁵⁹Department of Defense Instruction 7041.03, *Economic Analysis for Decision-making*, encl. 2, para. 4.b (Sept. 9, 2015). The guidance states that costs and benefits associated with each alternative under consideration should be quantified whenever possible, so that they may be included in the economic analysis calculations. When quantification is not possible, analysts should still attempt to document significant qualitative costs and benefits. See *id.*, para. 2.d.

⁶⁰[GAO-09-3SP](#).

determine the viability of the relocation of Marines to Hawaii and the establishment of a rotational presence in Australia.

Conclusions

The ability of DOD to coordinate its multiple relocation efforts and maintain the operational capabilities of its forces is important to the success of the U.S. presence in the Asia-Pacific region. DOD has developed a high-level synchronization plan and organized working groups that coordinate the relocation of Marines to Okinawa, but DOD has not fully resolved selected identified capability deficiencies associated with the relocation of Marines. If DOD officials do not resolve the selected identified capability deficiencies, they may be challenged in maintaining operational capabilities and could face higher costs in order to do so. It is important to resolve these selected identified capability deficiencies in the near term because it can take many years to plan, allocate resources, and develop facilities.

DOD has taken steps to develop its infrastructure plans for the relocation of Marines from Okinawa, such as the development of plans that identified alternatives for its infrastructure in Guam, CNMI, and Japan and the initial infrastructure plans for Hawaii and Australia. However, the Marine Corps' infrastructure schedule for Guam does not meet GAO's best practices for a reliable schedule. Without a reliable integrated master schedule, DOD may not have reasonable assurance of the reliability of information on current progress as well as potential sources of delays for the design and construction of infrastructure to support the relocation of Marines to Guam. Furthermore, DOD does not have a reliable schedule to assess progress and identify potential problems for the relocation to Guam. In addition, the Marine Corps has not completed its risk-management plan for Guam that documents its strategy for how it will address known construction risks, among other risks that may be present. Without a risk-management plan that identifies the Marine Corps' strategy for addressing risks to the infrastructure buildup in Guam, DOD will not have the information necessary to address risks for its infrastructure design and construction that will likely result in cost overruns and schedule delays related to the relocation. Moreover, DOD has taken steps to implement our June 2013 recommendation to update Okinawa installation master plans, but it has not identified short- or long-term sustainment needs for facilities in Okinawa. By fully implementing our June 2013 recommendation to include short- or long-term sustainment needs, DOD would be better positioned to mitigate infrastructure sustainment risks in Okinawa and could better ensure that facilities are adequate to carry out its mission until related realignment activities are

completed. DOD would also limit its risk of experiencing cost overruns resulting from having to sustain facilities longer than expected because of delays or uncertainties related to other Asia-Pacific relocation activities that officials project will need to occur before consolidating infrastructure.

DOD has made overall progress in developing its cost estimates for Guam since June 2013, but its estimates partially met best practices for reliable cost estimates for infrastructure in Guam, Hawaii, and Australia. Specifically, the cost estimates for Guam do not include a unifying Work Breakdown Structure, risk and sensitivity analyses, and an independent cost estimate. The cost estimates for Hawaii and Australia do not include a life-cycle cost estimate or a Work Breakdown Structure. Without a revision of current cost estimates for Guam, Hawaii, and Australia to fully address all of the best practices established by GAO's cost estimating guide, decision makers in DOD and Congress will not have reliable cost information to inform their funding decisions and to help them determine the viability of these options for the relocation and the establishment of a rotational presence.

Recommendations for Executive Action

We recommend that the Secretary of Defense take the following nine actions.

To improve the Department of Defense's ability to maintain its capability in the Asia-Pacific region, we recommend that the Secretary of Defense direct the appropriate entities to resolve selected identified capability deficiencies associated with the relocation in four areas:

- the movement of Marine Corps units by, for example, reconsidering when units should move to Guam to minimize leaving facilities vacant;
- training needs in Iwakuni, Hawaii, and CNMI by, for example, identifying other suitable training areas;
- reduction in runway length at the Futenma Replacement Facility by, for example, selecting other runways that would support mission requirements; and
- challenges in Australia regarding seasonal changes and biosecurity requirements that affect equipment downtime by, for example, deciding on a location for the wet season and identifying a solution for biosecurity requirements.

To provide DOD with reliable information on potential sources of delays for the design and construction of infrastructure in Guam, we recommend

that the Secretary of Defense direct the appropriate entities to update the Marine Corps' integrated master schedule for Guam so that it meets the comprehensive, well-constructed, and credible characteristics for a reliable schedule. For example, the update to the schedule should include resources for nonconstruction activities.

To provide DOD and Congress with sufficient information to mitigate risks for infrastructure construction and sustainment, we recommend that the Secretary of Defense direct the appropriate entities to complete a Risk Management Plan for Guam, and include, at a minimum, plans to address: (1) construction labor shortages, (2) explosive--ordnance detection, (3) cultural-artifact discovery and preservation, and (4) protection of endangered species.

To provide DOD and Congress with more-reliable information to inform funding decisions associated with the relocation of Marines to Guam, we recommend that the Secretary of Defense direct the appropriate entities to revise the cost estimates for Guam to address all best practices established by GAO's cost estimating guide. Specifically, the revisions to the cost estimates should include: a unifying Work Breakdown Structure, risk and sensitivity analyses, and an independent cost estimate.

To provide DOD and Congress with more-reliable information to inform funding decisions associated with the relocation of Marines to Hawaii and the establishment of a rotational presence in Australia, we recommend that the Secretary of Defense direct the appropriate entities to

- revise the DOD cost estimates for Hawaii to address all best practices for the comprehensive characteristic established by the GAO cost estimating guide, specifically to capture entire life-cycle costs and develop a Work Breakdown Structure and
- revise the DOD cost estimates for Australia to address all best practices for the comprehensive characteristic established by the GAO cost estimating guide, specifically to capture entire life-cycle costs and develop a Work Breakdown Structure.

Agency Comments and Our Evaluation

We provided a draft of this report for review and comment to DOD and the Department of State. In written comments, DOD concurred with two recommendations, partially concurred with six recommendations, and nonconcurred with one recommendation. After receiving a draft of the sensitive report in December 2016, DOD provided additional information and documentation in January and February 2017 based on new

developments in the bilateral negotiations between the governments of the United States and Australia, actions taken by DOD during our review in response to our draft report, and roles and responsibilities in the Asia-Pacific region. As a result of our review of the documentation provided and discussions with officials, we revised some of our findings to reflect this additional information, and we revised the wording of some of our recommendations. Specifically, in discussions in January 2017, DOD officials raised concerns about the stakeholders to whom we directed our recommendations, noting that multiple stakeholders have roles in the relocation. We agree there are multiple stakeholders and modified some recommendations to allow the Secretary of Defense to direct the appropriate entities to implement the recommendations, rather than identify the specific stakeholders. Additionally, we removed one finding and its related recommendation regarding challenges reaching an agreement between the United States and Australia relating to the mission of the Marine Corps units in Australia, given new documentation provided by DOD and updates in the bilateral negotiations. DOD's comments on this report are summarized below and reprinted in their entirety in appendix VI. In e-mail, the audit liaison from the Department of State indicated that the department did not have formal comments. DOD and the Department of State also both provided technical comments, which we incorporated as appropriate.

DOD partially concurred with our first four recommendations that the Secretary of Defense direct the appropriate entities to resolve selected identified capability deficiencies associated with the movement of Marine Corps units; training needs in Iwakuni, Hawaii, and CNMI; reduction in runway length at the Futenma Replacement Facility; and challenges in Australia regarding seasonal changes and biosecurity requirements. In its letter, DOD stated that the Marine Corps has already addressed, where applicable, the selected identified capability deficiencies. We disagree that the Marine Corps has addressed these capability deficiencies, given the ongoing concerns as noted in our report. Moreover, in January 2017, both the Marine Corps and Pacific Command provided additional documents to us stating that the four selected identified capability deficiencies were not yet resolved, and we address the specific points in the following paragraphs related to each recommendation.

With regard to our first recommendation that the Secretary of Defense direct the appropriate entities to resolve selected identified capability deficiencies associated with the movement of Marine Corps units, DOD stated that the Marine Corps' plans for movement of units from Okinawa to Guam has considered many factors, including, among others, the

capabilities required to support Pacific Command and the logistical requirements associated with the movement of forces. In its response, DOD stated it disagrees with our assessment that adequate planning with regard to minimizing operational downtime of III Marine Expeditionary Force during the movement to Guam has not been done. Rather, DOD stated that both the Marine Corps and Pacific Command have done extensive planning and analysis to determine how best to posture, move, and support forces from III Marine Expeditionary Force. In its response, DOD further noted Pacific Command's explanation that the existing plan cannot be considered fixed and final because of the requirement to adapt to changing conditions. DOD also noted that those conditions do not materially impact the infrastructure required. DOD added that the pace at which this movement is executed will continue to take into account the rate at which the required infrastructure is developed. Moreover, DOD's response stated that the Marine Corps is already working to ensure that its plan is continually refined to balance fiscal and construction realities with operational risk, capability requirements, and readiness.

Although DOD has taken initial steps to consider how to move Marine Corps units from Okinawa to Guam, we continue to believe it has not yet fully resolved this capability deficiency. We agree that DOD has taken some steps to analyze capability deficiencies regarding the movement of Marine Corps units, and we stated in our report that Marine Corps Forces Pacific conducted simulated wartime scenarios to assess the capability concerns that had been expressed by III Marine Corps Forces. However, as we also stated in our report, DOD has not completed its analysis or reached any decisions on how to move the forces. Further, as we stated, DOD anticipates that it will soon be rapidly increasing the number of construction projects in Guam, increasing from 4 projects as of July 2016 to 15 projects in fiscal year 2018. Those projects, which are already in the planning and development stage, will be affected if DOD has not made decisions on the movement of forces. Further, any changes could result in costly adjustments to the construction if decisions are made too late or could result in vacant facilities if the movement of units needs to be adjusted. DOD has not provided us evidence that, if plans are adapted to changing conditions, the effect on infrastructure will be minimal; in contrast, we have historically found that infrastructure changes can be costly to the department. Moreover, in January 2017, Marine Corps and Pacific Command officials continued to express concerns that decisions with regard to force structure and positioning of forces will ultimately affect facility planning adjustments. As a result, until DOD resolves how to move units from Okinawa to Guam, it risks hindering its mission requirements during the relocation.

With regard to our second recommendation that the Secretary of Defense direct the appropriate entities to resolve selected identified capability deficiencies associated with training needs in Iwakuni, Hawaii, and CNMI, DOD stated that it has already conducted an extensive analysis of training needs. Specifically concerning training requirements for CNMI, DOD stated that Pacific Command identified 42 combatant command–level training deficiencies to be fulfilled through the development of training ranges in Pacific Command’s area of responsibility. DOD added that, due to the complexity and scale of these training deficiencies, CNMI emerged as the only viable location on U.S. territory to address these deficiencies. DOD further stated it disagrees that a study to reexamine these and other potential training locations in the event that DOD is not able to meet all of its identified training requirements in CNMI is warranted or worthwhile years prior to the development of new training ranges in the CNMI.

With respect to the department’s assertion that DOD has already conducted an extensive analysis of training needs for the Marine Corps and the joint force in Iwakuni, Hawaii, and CNMI, we disagree. The assertion is contrary to evidence provided to us in documents and discussions we held with DOD officials. In particular, in February 2017, officials from U.S. Forces–Japan said that bilateral agreement was reached to establish a working group to study other possible locations beyond Kanoya Air Base for training, thus indicating that identification of other training locations near Iwakuni has not yet been resolved. With respect to Hawaii, in April 2016, Marine Corps officials told us they had not identified a timeline for when they plan to develop training plans, and in January 2017 Marine Corps officials added that there is significant work to be done to fully determine training requirements and conduct planning to meet those requirements. With respect to CNMI, in January 2017 both Pacific Command and the Marine Corps stated that DOD has not fully resolved the challenges associated with training areas. As noted in our report, the department received more than 27,000 comments in response to the draft environmental impact statement, and to address the multitude of comments the Department of the Navy stated it is developing a revised draft environmental impact statement. However, the Marine Corps synchronization matrix, as of June 2016, still showed construction scheduled to begin in Tinian as soon as 2017. We continue to believe that DOD should take actions to resolve capability deficiencies associated with training needs in Iwakuni, Hawaii, and CNMI; otherwise, it may take additional time, effort, and resources to resolve these deficiencies and it is uncertain whether the Marine Corps units will be able to complete necessary training in these locations.

With regard to our third recommendation that the Secretary of Defense direct the appropriate entities to resolve selected identified capability deficiencies associated with the reduction in runway length at the Futenma Replacement Facility, DOD stated that it disagreed that the length of the runway planned at the Futenma Replacement Facility is a capability deficiency for the Marine Corps. DOD stated that, at the time of its agreement with Japan, it understood that the Futenma Replacement Facility would not possess a long runway and that the Marine Corps drove the final requirements to support the capabilities required for their missions at the Futenma Replacement Facility.

While we agree that the shorter runway is not a deficiency for the Marine Corps, it is a deficiency that is ultimately connected with infrastructure plans for the Marine Corps in the context of relocation—specifically, infrastructure plans associated with Marine Corps relocation from Marine Corps Air Station Futenma. As such, we directed our recommendation to the Secretary of Defense to direct the appropriate entities for whom the shorter runway is a deficiency. As we wrote in our report, the shorter runway equates to the loss of an emergency landing strip for fixed-wing aircraft in the area and the loss of the United Nations use of a runway. These capability deficiencies affect the Air Force and U.S. Forces–Japan and have not yet been resolved. Additionally, as we stated in our report, senior officials from U.S. Forces–Japan said that, given the large Japanese investment into the Futenma Replacement Facility, it may be likely that the United States becomes pressured by the government of Japan to return Marine Corps Air Station Futenma even if the replacement runway deficiency is not resolved. If this return were to occur without a replacement runway identified, DOD mission capabilities could be hindered. Until this deficiency is resolved, DOD may be unable to maintain all mission capabilities or face higher costs to do so.

With regard to our fourth recommendation that the Secretary of Defense direct the appropriate entities to resolve selected identified capability deficiencies associated with challenges in Australia regarding seasonal changes and biosecurity requirements that affect equipment downtime, DOD stated that these factors are not capability deficiencies but rather real-world constraints around which DOD and Australia are working to develop the most bilaterally beneficial annual program possible. DOD also stated that the Marine Corps continues to coordinate closely with the Australian Department of Agriculture, Fisheries, and Forestry to develop best practices to train Marines as assistant inspectors to minimize the cost, in time and money, to conduct biosecurity inspections.

We agree that the department likely understood these issues when it first began planning for the rotational presence to Australia, but knowing about these issues does not negate the fact that DOD has not yet determined how it plans to resolve them. These issues remain relevant to the Marine Corps, as it will need to determine where to place up 2,500 Marines when some units can no longer return to Okinawa and how to reduce readiness risks when its equipment is unusable due to biosecurity screening requirements. As we noted in our report, DOD officials are considering multiple options for the wet season, but no decisions have been made, and Marine Corps officials have identified constraints for each option being considered. Moreover, as stated in our report, in January 2017 Pacific Command and Marine Corps officials stated that challenges remain to fund and source a dedicated equipment set. Initial force flow has already begun, and the cost-sharing arrangement between the governments of the United States and Australia was signed in January 2017, which will likely allow for construction decisions to be made in the near term. DOD has the opportunity now—before force flow increases and DOD spends additional effort and resources—to make prudent decisions to avoid needing to make costly corrections later. As a result, we continue to believe that DOD should take actions to resolve these challenges in Australia in order to help ensure that its plans are fully developed and resources are identified so that DOD and Congress can make prudent and informed funding decisions to resolve these challenges.

DOD concurred with our fifth recommendation that the Secretary of Defense direct the appropriate entities to update the Marine Corps' integrated master schedule for Guam so that it meets the comprehensive, well-constructed, and credible characteristics for a reliable schedule. In its response, DOD stated that, in September 2016, it began updating its integrated master schedule based on our review to conform to the GAO *Schedule Assessment Guide* and plans to adopt the best practices of assigning resources and establishing activity durations to ensure the schedule is comprehensive. Also, DOD plans to continue to work to verify that the schedule can be traced horizontally and vertically and conduct a schedule risk analysis. If fully implemented, we believe that DOD's proposed actions will better provide DOD with reliable information on potential sources of delays for the design and construction of infrastructure in Guam.

DOD concurred with our sixth recommendation that the Secretary of Defense direct the appropriate entities to complete a risk-management plan for Guam, and include, at a minimum, plans to address: (1)

construction labor shortages, (2) explosive-ordnance detection, (3) cultural-artifact discovery and preservation, and (4) protection of endangered species. In its response, DOD cited actions it has previously taken and plans to mitigate risks for infrastructure construction and sustainment, such as coordinating with the U.S. Citizenship and Immigration Services to address foreign-worker visas, approving an explosive-safety exemption for construction projects in Guam and CNMI, and developing a monitoring and mitigation tracking plan to ensure Navy compliance and execution of environmental requirements. These past and planned actions, as well as DOD's concurrence with our recommendation, should better address risks to the design and construction of its infrastructure and, in turn, reduce the potential for cost overruns and schedule delays.

DOD nonconcurred with our seventh recommendation that the Secretary of Defense direct the appropriate entities to revise the cost estimates for Guam to address all best practices established by GAO's cost estimating guide. In its response, DOD stated that the department does not accept the assertion that GAO's best practices are universally applicable to a wide range of activities that includes military construction, acquisition, or basing. DOD stated that the Guam program was developed and communicated to Congress consistently with statute and the department's long-standing supporting policies. Specifically, DOD noted that DOD Financial Management Regulation, Volume 2B, Chapter 6, requires inclusion of a form for each project submitted with the budget request, containing certain information. According to DOD, per this guidance, a contractor develops a detailed Work Breakdown Structure when the construction contract is awarded, which is much later in the project execution timeline than our expectations. DOD further stated that it is unrealistic for DOD to develop detailed Work Breakdown Structures for over 100 independent construction projects prior to any construction project getting under way. Moreover, DOD states that it provides sufficient information to support military construction decisions, and in cases where Congress desires additional information on a particular project, it routinely requests and receives that information.

We continue to believe that our cost estimating guide provides a consistent methodology that is based on best practices and that can be used across the federal government—including DOD—for developing, managing, and evaluating capital program cost estimates. Moreover, as noted in our report, there is no Work Breakdown Structure to tie the cost estimates and schedule together. A Work Breakdown Structure is the cornerstone of every program because it defines in detail the work

necessary to accomplish a program's objectives, and it provides a consistent framework for planning and assigning responsibility for the work. Further, we do not state that DOD should develop detailed Work Breakdown Structures for over 100 independent construction projects. Rather, we state that DOD should have a unifying Work Breakdown Structure to align the Guam Rainbow Chart—DOD's program-management tool that summarizes detailed program inputs—to the schedule or the cost estimate. Per GAO's cost estimating guide, a Work Breakdown Structure should be initially set up when the program is established and becomes successively detailed over time as more information becomes known about the program. In its response, DOD did not dispute our findings and related recommendation that the revisions to the Guam cost estimates should include risk and sensitivity analyses and an independent cost estimate; we believe these revisions remain relevant as well. We continue to believe that, without a revision of cost estimates for Guam to include the best practices established by GAO's cost estimating guide, decision makers in DOD and Congress will not have reliable cost information to inform their funding decisions regarding infrastructure for the Marine Corps relocation to Guam.

Finally, DOD partially concurred with our eighth and ninth recommendations that the Secretary of Defense direct the appropriate entities to revise the DOD cost estimates for Hawaii and Australia to address all best practices for the comprehensive characteristic established by the GAO cost estimating guide, specifically to capture entire life-cycle costs and develop a Work Breakdown Structure. In its response, the department agreed that good cost estimating practices are prudent for good decision making but did not agree that it should expend effort to update its cost estimates for the Hawaii and Australia programs due to reasons of timing, in the case of Hawaii, and international agreements, in the case of Australia. Specifically, DOD stated that, for Hawaii, high-level cost estimates are sufficient at this early planning stage and a detailed Work Breakdown Structure is not needed. Moreover, in its response, DOD stated that it disagrees with what constitutes the program life cycle. DOD stated it believes that the program is complete when forces move and occupy the new facilities. Regarding Australia cost estimates, DOD stated in its response that the costs borne by DOD under this program will be subject to international agreement rather than the GAO cost estimating guide.

Per GAO's *Cost Estimating and Assessment Guide*, we are not recommending a Work Breakdown Structure for specific construction projects, but rather a Work Breakdown Structure that combines all of the

different projects involved in the overall program. We continue to believe that DOD should develop a Work Breakdown Structure that lays out the costs at a high level so that DOD can easily see and track accomplishments. Then, as the program continues, DOD can add detail to those areas of the Work Breakdown Structure when they are further defined. Additionally, life-cycle costing enhances decision making, especially in early planning and concept formulation of acquisition. While DOD notes that it incorporates best practices for minimizing facility maintenance and sustainment costs into its construction costs, a full life-cycle cost estimate is important in budgetary decisions, key decision points, milestone reviews, and investment decisions. Without considering operations and support throughout the entire life cycle, DOD is not considering all possible costs of what the facilities will cost over time. With regard to Australia's cost estimate, costs could still be identified in a Work Breakdown Structure and then later assigned to either the United States or Australia. We continue to believe that revising cost estimates for Hawaii and Australia to include all of the best practices established by GAO's cost estimating guide for the comprehensive characteristic will better enable decision makers in DOD and Congress to make informed funding decisions and determine the viability of the relocation of Marines to Hawaii and the establishment of a rotational presence in Australia.

We are sending copies of this report to the appropriate congressional committees; the Secretary of Defense; the Secretaries of the Army, Navy, and Air Force; the Commandant of the Marine Corps; and the Department of State. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-4523 or leporeb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VII.



Brian J. Lepore
Director, Defense Capabilities and Management

List of Committees

The Honorable John McCain
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Jerry Moran
Chairman
The Honorable Brian Schatz
Ranking Member
Subcommittee on Military Construction, Veterans' Affairs,
and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Mac Thornberry
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Charles Dent
Chairman
The Honorable Debbie Wasserman Schultz
Ranking Member
Subcommittee on Military Construction, Veterans' Affairs,
and Related Agencies
Committee on Appropriations
House of Representatives

Appendix I: Objectives, Scope, and Methodology

The objectives of our review were to examine the extent to which the Department of Defense (DOD) has (1) coordinated its efforts and resolved selected identified capability deficiencies related to the relocation of Marines from Okinawa, (2) developed infrastructure plans and schedules for its relocation efforts and completed risk planning for its infrastructure that will support the relocation, and (3) developed reliable cost estimates for infrastructure for the relocation to Guam and Hawaii and for the rotational presence in Australia.

This report is a public version of a sensitive report that we are issuing concurrently.¹ DOD deemed some of the information in the sensitive report as For Official Use Only, which must be protected from public disclosure. Therefore, this report omits For Official Use Only information and data on some of the Navy and Marine Corps plans and programs associated with the realignment effort, deployment and allies' considerations, and estimates of future actions and political concerns associated with Marine Corps forward stationing. Although the information provided in this report is more limited in scope, it addresses the same objectives as the sensitive report. Also, the methodology used for both reports is the same.

For all objectives, we scoped our review to actions taken since GAO last reviewed Marine Corps realignment initiatives in the Asia-Pacific region in June 2013.² We reviewed relevant policies and procedures, and collected information by interviewing and communicating with officials from the Office of the Under Secretary of Defense (Policy), the Office of the Under Secretary of Defense (Comptroller), the Air Force, the Army, the Navy, the Marine Corps, and the State Department. We also conducted site visits in the following areas: Hawaii, where we met with Pacific Command and its service components; Japan, where we met with U.S. Forces—Japan and the services, Marine Corps Installation Command Pacific, III Marine Expeditionary Force, the U.S. Embassy in Tokyo, and the U.S. Consulate on Okinawa, and observed infrastructure conditions in Okinawa and Iwakuni; and Guam, where we met with DOD and government of Guam officials, and observed infrastructure conditions and

¹GAO, *Marine Corps Asia-Pacific Realignment: DOD Should Resolve Capability Deficiencies and Infrastructure Risks and Revise Cost Estimates*, GAO-17-107SU (Washington, D.C.: Apr. 5, 2017).

²GAO, *Defense Management: More Reliable Cost Estimates and Further Planning Needed to Inform the Marine Corps Realignment Initiatives in the Pacific*, [GAO-13-360](#) (Washington, D.C.: June 11, 2013).

the buildup of Marine Corps Base Guam. Additionally, we interviewed DOD officials and officials from the U.S. Embassy in Australia. We also met with DOD's construction agents, specifically the U.S. Army Corps of Engineers and the Naval Facilities Engineering Command.

To determine the extent to which DOD has coordinated efforts and resolved selected identified capability deficiencies related to the relocation of Marines from Okinawa, we reviewed DOD documentation and interviewed knowledgeable officials. Specifically, we reviewed documentation such as the Marine Corps' Asia-Pacific Realignment Synchronization Matrix; capability documents such as bilateral agreements between the United States and Japan or Australia as well as training requirement documentation; and other documentation including program management plans for the various locations supporting the relocation. We reviewed capability deficiencies that were identified by DOD through interviews. We compared DOD's decision-making process for plans to resolve the identified capabilities to DOD Unified Facilities Criteria regarding identifying mission needs to determine land and facility support requirements.³

To determine the extent that DOD has developed plans and schedules for its relocation efforts and completed risk planning for its infrastructure, we reviewed DOD guidance related to the development of installation plans, integrated master schedules, and risk planning. We identified current infrastructure plans and integrated master schedules. Specifically, we assessed the Guam integrated master schedule to determine whether this schedule reflects best practices needed to implement a program as well as the extent to which projects and activities were properly sequenced. GAO schedule specialists reviewed the Guam schedule and compared it with best practices in GAO's *Schedule Assessment Guide* to determine the extent to which it reflects 10 key schedule estimating

³Department of Defense, Unified Facilities Criteria 2-100-01, *Installation Master Planning* (May 15, 2012).

practices that are fundamental to having a reliable schedule.⁴ These practices address whether the schedule (1) captured all activities, (2) sequenced all activities, (3) assigned resources to all activities, (4) established the duration of all activities, (5) can be traced horizontally and vertically, (6) established a valid critical path, (7) identified reasonable total float between activities, (8) identified a level of confidence using a schedule risk analysis, (9) was updated using progress and logic to determine dates, and (10) maintained a baseline schedule. To do so, we independently assessed the program's integrated master schedule compared to these 10 best practices and determined an assessment rating for each best practice. Then we determined an overall assessment rating for the 4 characteristics of a reliable schedule based on averages of the 10 best practices. When the program office made updates to the integrated master schedule, we conducted our review again to reflect those updates. We also received two detailed construction project schedules and assessed them for resource assignments. In addition, we interviewed cognizant program officials to discuss their use of best practices in creating the program's current schedule to better understand how the schedule was constructed and maintained. Moreover, we reviewed documentation and conducted interviews with DOD officials to determine any identified risks to the schedule and actions DOD has taken to address those risks. We compared DOD's risk-planning efforts outlined in that documentation to DOD guidance on addressing risk, such as guidance that identifies the characteristics needed in a risk-management

⁴GAO, *Schedule Assessment Guide: Best Practices for Project Schedules*, [GAO-16-89G](#) (Washington, D.C.: Dec. 22, 2015). We assessed the July 2016 version of the integrated master schedule for the relocation to Guam against the GAO *Schedule Assessment Guide*. The Marine Corps also began developing integrated master schedules for realignment activities in Japan, such as for the Okinawa Consolidation and Futenma Replacement Facility. We did not assess the integrated master schedule for Okinawa Consolidation because, at the time of our review, it was not yet developed. We did not assess the integrated master schedule for the Futenma Replacement Facility because officials said the schedule was subject to changes based on ongoing legal issues with the government of Japan. We also did not assess the integrated master schedule for Marine Corps Air Station Iwakuni because most of the construction projects for this base had already begun.

plan and guidance on how DOD plans for infrastructure sustainment in base master plans.⁵

To determine the extent to which DOD has developed reliable cost estimates for infrastructure for the relocation to Guam and Hawaii and for the rotational presence in Australia, we reviewed DOD's cost estimates and analyses and interviewed DOD and Department of State officials about costs and funding sources related to infrastructure in locations considered for relocation. GAO cost estimation specialists compared those estimates and analyses to the best practices included in GAO's *Cost Estimating and Assessment Guide*.⁶ We also reviewed the Office of Management and Budget's *Capital Programming Guide*, and DOD's guidance on *Economic Analysis for Decision-making*, which support our best practices for developing reliable cost estimates.⁷ Specifically, GAO's *Cost Estimating and Assessment Guide* identifies best practices that represent work across the federal government and are the basis for a high-quality, reliable cost estimate.⁸ A cost estimate created using best practices exhibits four broad characteristics: accurate, well-documented, credible, and comprehensive.⁹ In assessing program cost estimates for Guam, GAO cost estimation specialists evaluated the Marine Corps program office estimating methodologies, assumptions, and results to determine whether the official cost estimates were comprehensive, accurate, well-documented, and credible. As the basis of our assessment, we used our GAO *Cost Estimating and Assessment Guide* on estimating program schedules and costs, which was developed based on extensive

⁵Department of Defense, *DOD Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs* (Washington, D.C.: June 2015); Department of Defense Instruction 4165.70, *Real Property Management* (Apr. 6, 2005). Although the risk-management guidance is specific to the defense acquisition context, officials from the Navy's Guam Program Management Office stated that they will base the risk-management plan on principles found within it.

⁶GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: Mar. 2, 2009).

⁷Office of Management and Budget, *Capital Programming Guide: Supplement to OMB Circular A-11: Planning, Budgeting, and Acquisition of Capital Assets*, app. 8, ver. 3.0 (July 2016). Department of Defense Instruction 7041.03, *Economic Analysis for Decision-making* (Sept. 9, 2015).

⁸[GAO-09-3SP](#).

⁹[GAO-09-3SP](#).

research of cost estimating best practices.¹⁰ Our *Cost Estimating and Assessment Guide* considers an estimate to be accurate if it is not overly conservative, is based on an assessment of the most likely costs, and is adjusted properly for inflation; comprehensive if its level of detail ensures that all pertinent costs are included and no costs are double-counted or omitted; well-documented if the estimate can be easily repeated or updated and can be traced to original sources through auditing; and credible if the estimate has been cross-checked with an independent cost estimate and a level of uncertainty associated with the estimate has been identified and quantified. We also interviewed the Marine Corps program office's cost estimating team to obtain a detailed understanding of the cost models provided, and met with Marine Corps headquarters, Marine Corps Forces Pacific Command, and Naval Facilities Engineering Command Pacific to understand their methodology, data, and approach in developing their independent cost estimate (if applicable). In doing so, we interviewed cognizant program officials, including the Program Manager and cost analysis team, regarding their respective roles, responsibilities, and actual efforts in developing and reviewing the cost estimate.

In assessing program cost estimates for Hawaii and Australia, GAO cost estimation specialists conducted a limited assessment focused on the comprehensive characteristic because the estimates developed and provided by DOD are early in the program life cycle (e.g., they are Rough Order of Magnitude estimates), and as such the information is immature and inadequate to support a full analysis. Therefore, we chose to review only the comprehensive characteristic because, according to GAO's *Cost Estimating and Assessment Guide*, if the cost estimate is not comprehensive then it cannot fully meet the well-documented, accurate, or credible best practice characteristics. For instance, if the cost estimate is missing some cost elements, then the documentation will be incomplete, the estimate will be inaccurate, and the result will not be credible due to the potential underestimating of costs and the lack of a full risk and uncertainty analysis.

We conducted this performance audit from January 2016 to April 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our

¹⁰The methodology outlined in the *Cost Estimating and Assessment Guide* is a compilation of best practices that federal cost estimating organizations and industry use to develop and maintain reliable cost estimates throughout the life of an acquisition program.

findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Defense Policy Review Initiative

The Defense Policy Review Initiative (DPRI) is a bilateral force-posture realignment program between the U.S. and Japanese governments. Led by the U.S.-Japan Security Consultative Committee, DPRI consists of a package of 19 interrelated and interdependent initiatives for Japan and Guam with touch points to other areas in the U.S. Pacific Command area of responsibility, such as Tinian in the Commonwealth of the Northern Mariana Islands. According to the Department of Defense (DOD), implementation of 17 of the 19 DPRI initiatives is managed by subcommittees, panels, and working groups established and operating under the auspices of the U.S.-Japan Joint Committee. The other two initiatives—the Guam Master Plan and Missile Defense initiative—are managed on the U.S. side by the Joint Guam Program Office and the Missile Defense Agency, respectively. See table 4 for a list of the 19 initiatives and a short summary describing each effort.

Table 4: Defense Policy Review Initiatives

Initiative	Summary
Okinawa	
1. Futenma Replacement Facility	Construct Futenma Replacement Facility at Camp Schwab and relocate Marine Corps aviation units from Marine Corps Air Station Futenma
2. Okinawa force reduction and realignment	Relocate approximately 9,000 Marines and their dependents from Okinawa
3. Consolidation, return of land, and move north	Return five complete and one partial U.S. forces facilities; U.S. forces functions and capabilities will be consolidated into enduring U.S. forces facilities on Okinawa
4. Shared use of Okinawa with Japan Self-Defense Force	Increase training and exercise use of Camp Hansen by Japan Ground Self-Defense Force and Kadena Air Base by Japan Air Self-Defense Force
Kanagawa^a	
5. Establish transformed Headquarters U.S. Army Japan / I Corps Forward at Camp Zama	Establish a U.S. Army headquarters (I Corps Forward) at Camp Zama which is capable of deploying a joint task force
6. Relocate Headquarters Japan Ground Self-Defense Force—Central Readiness Force to Camp Zama	Construct facilities and relocate units
7. Sagami General Depot Master Plan	Release 17 hectares for local redevelopment, provide 35 hectares of open space for local use when not required for contingency or training purposes, and construct a battle command training center
Iwakuni, Atsugi, and Kanoya^b	
8. Relocate CVW-5 to Marine Corps Air Station Iwakuni ^c	Relocate Navy carrier fixed-wing aircraft and facilities from Naval Air Field Atsugi
9. Marine Corps Air Station Iwakuni Master Plan	Relocate Marine Corps tanker aircraft and facilities from Marine Corps Air Station Futenma and relocate Navy carrier fixed-wing aircraft and facilities from Naval Air Field Atsugi

Initiative	Summary
10. Naval Air Field Atsugi Master Plan	Relocate Japan Maritime Self-Defense Force aircraft squadrons and related facilities from Marine Corps Air Station Iwakuni (canceled at government of Japan's request)
11. Field Carrier Landing Practice	Develop a permanent primary field carrier landing practice facility to maintain CVW-5 training and readiness
Yokota	
12. Establish Bilateral Joint Operations Coordination Center at Yokota Air Base	Establish coordination center with a colocated air and missile defense coordination function
13. Relocate Headquarters Japan Air Self-Defense Force Air Defense Command to Yokota Air Base	Construct Japan Air Self-Defense Force facilities and make necessary adjustments to Yokota Air Base
14. Yokota Air Base Airspace Adjustment	Return agreed portions of Yokota air space to Japan and complete a study of conditions required for possible return of entire Yokota airspace
15. Yokota Air Base Commercial Dual-Use Study	Complete a study of conditions required for possible civilian-military dual-use of Yokota with the shared understanding that such use must not compromise safety or U.S. military operational capabilities
Contingency Use / Training Relocation	
16. Contingency Use of Japan Self-Defense Force Facilities	Government of Japan agreed to make improvements at Japan Self-Defense Force facilities and improve access to civilian facilities as necessary in support of Marine Corps Air Station Futenma capability replacement and U.S. contingency use requirements
17. Training relocation (U.S. training to Japan Self-Defense Force facilities)	Improve operational readiness, bilateral interoperability, and reduce impact on local communities. Government of Japan funds 75 percent of the cost to train at Andersen Air Force Base, Guam, and Japan Air Self-Defense Force Air Bases Misawa, Chitose, Hyakuri, Komatsu, Nyutabaru, and Tsuiki ^d
Others	
18. Guam master plan	Develop a detailed master plan aligning project and funding timelines to support the realignment of Marines from Okinawa to Guam
19. Missile defense	Bolster layered missile defenses for the Joint Force's strategic hub at Guam, including improvements at Apra Harbor for advanced naval capabilities, hardening of key facilities, and installation of a Terminal High Altitude Aerial Defense battery

Source: GAO summary of initiatives undertaken by U.S. Forces-Japan, Joint Guam Program Office, and Missile Defense Agency. | GAO-17-415

^aThe Kanagawa initiative is focused on Army efforts and is located in mainland Japan.

^bIwakuni, Atsugi, and Kanoya are located in mainland Japan.

^cThe CVW-5 is the Carrier Air Wing that is moving from Atsugi to Iwakuni.

^dAir Bases Misawa, Hyakuri, and Komatsu are air bases in mainland Japan. Air Base Chitose is an air base on the Japanese island of Hokkaido. Air Bases Tsuiki and Nyutabaru are air bases on the Japanese island of Kyushu.

Appendix III: GAO Assessment of the Marine Corps' Integrated Master Schedule for Guam

This appendix summarizes our assessment of the integrated master schedule for Guam compared to GAO's *Schedule Assessment Guide*. We found the integrated master schedule is not reliable because it did not meet the characteristics of a reliable schedule identified in the guide.¹ Specifically, there are 10 best practices associated with a reliable schedule that are summarized in 4 characteristics: comprehensive, well-constructed, credible, and controlled.²

For this analysis, we had five assessment categories: not met (provided no evidence that satisfies any of the criterion), minimally met (provided evidence that satisfies a small portion of the criterion), partially met (provided evidence that satisfies about half of the criterion), substantially met (provided evidence that satisfies a large portion of the criterion), and fully met (provided complete evidence that satisfies the entire criterion). We determined an assessment rating for each of the 10 best practices, and then determined an overall assessment rating for each characteristic based on the ratings for the best practices within each characteristic in table 5. A schedule is considered reliable if the overall assessment ratings for each of the four characteristics are substantially or fully met. GAO shared this analysis with Department of Defense officials. Table 5 only includes the reasons why best practices were not met, minimally met, or partially met.

¹GAO, *Schedule Assessment Guide: Best Practices for Project Schedules*, [GAO-16-89G](#) (Washington, D.C.: Dec. 22, 2015).

²[GAO-16-89G](#).

Table 5: Assessment Tables of the Marine Corps' Integrated Master Schedule for Guam Compared to Characteristics of Reliable Schedules

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Comprehensive	Partially met	<p>Capturing all activities.</p> <p>Assigning resources to all activities.</p> <p>Establishing the duration of all activities.^a</p>	<p>Substantially met</p> <p>Partially met: The Marine Corps updates the integrated master schedule with information summarized from lower-level project schedules; however, not all activities in the integrated master schedule are supported by lower-level project schedules that fully identify resources.</p> <p>Partially met: The Marine Corps uses multiple sources of information to estimate activity durations. However, the Marine Corps does not clearly define the durations of some activities in the integrated master schedule that it designates as placeholder activities. Additionally, the Marine Corps does not document the estimation techniques used to calculate activity durations.</p>
Well-constructed	Partially met	<p>Sequencing all activities.</p> <p>Confirming that the critical path is valid.^b</p> <p>Ensuring reasonable total float.^c</p>	<p>Substantially met</p> <p>Minimally met: The integrated master schedule has five critical paths: one each for four activity groups and one for the final completion date for the Guam effort. As a result of our initial assessment, the Marine Corps removed constraints that negatively impacted the critical path; however, the four activity groups have remaining constraints that prevented the scheduling software from calculating accurate end dates for those critical paths.</p> <p>Minimally met: According to Marine Corps officials, they annually assess the effect of changing the start dates for projects on the program's completion date. However, the integrated master schedule contains activities that do not realistically reflect the schedule's total float, preventing the Marine Corps from accurately determining the program's flexibility.</p>
Credible	Minimally met	<p>Verifying that the schedule can be traced horizontally and vertically.^d</p> <p>Conducting a schedule risk analysis.^e</p>	<p>Partially met: The schedule is vertically traceable as lower levels of the schedule are summarized in higher levels of the schedule, however, the schedule is not horizontally traceable since there are activity constraints that prevent those activities from updating other related activities in the schedule.</p> <p>Not met: The Marine Corps has not conducted a schedule risk assessment, but is in the process of identifying risks to the program.</p>

Appendix III: GAO Assessment of the Marine Corps' Integrated Master Schedule for Guam

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Controlled	Substantially met	Updating the schedule using actual progress and logic. Maintaining a baseline schedule. ^f	Substantially met Partially met: The Marine Corps has developed a baseline schedule for the program; however, it does not use this schedule to track the program's progress.

Source: GAO analysis of Marine Corps data. | GAO-17-415

^aFor a schedule, the duration refers to the estimated time to complete an activity, specifically between the start and end dates.

^bA critical path is the path of longest duration through a sequence of activities; specifically, it helps a program determine which activities are critical to achieving a project's earliest possible completion date.

^cTotal float is the amount of time an activity can be delayed before that delay affects the program's estimated completion date.

^dA schedule is horizontally traceable if the schedule has program elements that are linked to one another through straightforward logic, including activities and program milestones. A schedule is vertically traceable if the lower-level and higher-level schedules are consistent with one another.

^eA risk assessment is a part of the program's overall risk-management process in which risks are identified and analyzed and the program's risk exposure is determined. As risks are identified, program management develops risk-management plans and incorporates those plans into the program's schedule, as necessary.

^fA baseline schedule outlines the target schedule for a program, including the program's scope, the period for accomplishing it, and the required resources.

Appendix IV: Assessment Tables of DOD’s Realignment Cost Estimates for Guam Compared to Characteristics for Reliable Cost Estimates

For this analysis, GAO cost estimating specialists assessed the realignment cost estimates for military construction and nonmilitary construction in Guam against the best practices for each of the four characteristics—comprehensive, well-documented, accurate, and credible—for reliable cost estimates, and also provided an overall assessment for each characteristic. This analysis has five assessment categories for the best practices and the characteristics: not met (provided no evidence that satisfies any of the criterion), minimally met (provided evidence that satisfies a small portion of the criterion), partially met (provided evidence that satisfies about half of the criterion), substantially met (provided evidence that satisfies a large portion of the criterion), and fully met (provided complete evidence that satisfies the entire criterion). A cost estimate is considered reliable if the overall assessment ratings for each of the four characteristics are fully or substantially met. Tables 6 and 7 include our detailed assessment of the Department of Defense’s (DOD) military construction and nonmilitary construction cost estimates for Guam, respectively, regarding each of the best practices for the four characteristics for reliable cost estimates. GAO shared this analysis with DOD officials. Tables 6 and 7 only include the reasons why best practices were not met, minimally met, or partially met.

Table 6: Assessment of the DOD Realignment Cost Estimates for Guam Military Construction Compared to Characteristics for Reliable Cost Estimates

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Comprehensive	Substantially met	Includes all life-cycle costs. ^a	Substantially met
		Completely defines the program, reflects the current schedule, and is technically reasonable.	Substantially met
		Work Breakdown Structure is product-oriented, traceable to the statement of work, and at an appropriate level of detail to ensure that cost elements are neither omitted nor double-counted. ^b	Substantially met
		Documents all cost-influencing ground rules and assumptions.	Substantially met

**Appendix IV: Assessment Tables of DOD's
Realignment Cost Estimates for Guam
Compared to Characteristics for Reliable Cost
Estimates**

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Well-documented	Substantially met	Should capture the source data used, the reliability of the data, and how the data were normalized. ^c	Substantially met
		Describes in sufficient detail the calculations performed and the estimating methodology used to derive each element's cost.	Fully met
		Describes step by step how the estimate was developed so that a cost analyst unfamiliar with the program could understand what was done and replicate it.	Substantially met
		Discusses the technical baseline description, and the data in the baseline are consistent with the estimate.	Substantially met
		Provides evidence that the cost estimate was reviewed and accepted by management.	Substantially met
Accurate	Substantially met	Results are unbiased, not overly conservative or optimistic, and based on an assessment of most likely costs.	Minimally met: Since a risk assessment was not performed, it is not possible to determine the confidence level of the cost estimate. However, the Marine Corps includes a 20 percent contingency for the cost estimate outside of the budget years; therefore, the amounts in the budget out-years have some contingency added already.
		Has been adjusted properly for inflation.	Fully met
		Contains few, if any, minor mistakes.	Fully met
		Regularly updated to reflect significant changes in the program so that it is always reflecting current status.	Fully met
		Variances between planned and actual costs are documented, explained, and reviewed.	Partially met: Actual costs are tracked by management; however, individual cost estimates are not updated with the actual costs until the effort has been completed. Actual costs are only used for future estimates.
		Is based on a historical record of cost estimating and actual experiences from other comparable programs.	Substantially met

Appendix IV: Assessment Tables of DOD's
 Realignment Cost Estimates for Guam
 Compared to Characteristics for Reliable Cost
 Estimates

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Credible	Minimally met	<p>Includes a sensitivity analysis that identifies a range of possible costs based on varying major assumptions, parameters, and data inputs.</p> <p>A risk and uncertainty analysis was conducted in order to capture the cumulative effect of additional risk.</p> <p>Major cost elements were cross-checked to see whether results were similar.</p> <p>An independent cost estimate was conducted by a group outside the acquiring organization to determine whether other estimating methods produce similar results.</p>	<p>Minimally met: There is no sensitivity analysis done as part of developing the cost estimate. However, during the planning process, sensitivity tradeoffs are looked at as different alternatives are considered.</p> <p>Minimally met: The project has a risk-management plan but has not conducted a formal cost risk assessment.</p> <p>Not met: There is no evidence provided that shows major cost elements were cross-checked using different methodologies.</p> <p>Partially met: The Naval Center for Cost Analysis performed a review of the 2010 Guam cost estimate and made several recommendations to improve the estimate. Since the review, the cost estimate for Guam has been updated to include operation and maintenance costs and costs from other organizations; however, not all recommendations were implemented.</p>

Source: GAO analysis of Department of Defense (DOD) data. | GAO-17-415

^aThe life-cycle cost of a program includes both government and contractor costs of the program over its full life cycle, from inception of the program through design, development, deployment, and operation and maintenance to retirement of the program.

^bA Work Breakdown Structure defines in detail the work necessary to accomplish a program's objectives. It reflects the program requirements and provides a basis for identifying resources and tasks for developing a program cost estimate.

^cThe purpose of data normalization is to make a given data set consistent with and comparable to other data used in the estimate. Since data can be gathered from a variety of sources, they are often in many different forms and need to be adjusted before being used for comparison analysis or as a basis for projecting future costs.

Appendix IV: Assessment Tables of DOD's
 Realignment Cost Estimates for Guam
 Compared to Characteristics for Reliable Cost
 Estimates

Table 7: Assessment of the DOD Realignment Cost Estimates for Guam Nonmilitary Construction Compared to Characteristics for Reliable Cost Estimates

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Comprehensive	Partially met	<p>Includes all life-cycle costs.^a</p> <p>Completely defines the program, reflects the current schedule, and is technically reasonable.</p> <p>Work Breakdown Structure is product-oriented, traceable to the statement of work, and at an appropriate level of detail to ensure that cost elements are neither omitted nor double-counted.^b</p> <p>Documents all cost-influencing ground rules and assumptions.</p>	<p>Substantially met</p> <p>Partially met: The Guam Master Plan provides a high-level planning overview of the requirements (including program-level costs and schedules) for plan implementation. However, there is no document that currently includes enduring costs or fully describes the requirements for the nonenduring costs that are included.</p> <p>Minimally met: There is a Work Breakdown Structure established in the program's schedule, but there is no unifying Work Breakdown Structure that aligns the Guam Rainbow Chart to the schedule or the estimates to the Guam Rainbow Chart.^c</p> <p>Partially met: The environmental estimate documented the underlying ground rules and assumptions for each project. However, the facilities sustainment estimates were based solely on the Office of the Secretary of Defense pricing guide even for projects that were under contract, which is counter to best practices. The Guam Master Plan does not document the requirements and assumptions for the nonmilitary construction costs. Additionally, there is no document that compiles the assumptions for the underlying estimates, and each estimate has a different quality of documentation associated with it.</p>

Appendix IV: Assessment Tables of DOD's
Realignment Cost Estimates for Guam
Compared to Characteristics for Reliable Cost
Estimates

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Well-documented	Minimally met	<p>Should capture the source data used, the reliability of the data, and how the data were normalized.^d</p> <p>Describes in sufficient detail the calculations performed and the estimating methodology used to derive each element's cost.</p> <p>Describes step by step how the estimate was developed so that a cost analyst unfamiliar with the program could understand what was done and replicate it.</p> <p>Discusses the technical baseline description, and the data in the baseline are consistent with the estimate.</p> <p>Provides evidence that the cost estimate was reviewed and accepted by management.</p>	<p>Minimally met: In the combined enduring and non-enduring workbooks, there is no mention regarding the source information for any of the data or discussion of data normalization aside from adjusting the underlying cost estimates for inflation.^e Additionally, the data used to develop the underlying cost models for the facilities sustainment and information technology cost estimates are based solely on throughputs and secondary data sources provided by outside organizations, and the environmental estimate relies heavily on subject-matter expert opinion.</p> <p>Minimally met: The combined enduring and nonenduring cost workbooks and the Guam Master Plan did not document the calculations performed or methodologies used to develop the Guam effort's nonmilitary construction costs. The Guam Master Plan provides high-level assumptions associated with several of the underlying estimates.</p> <p>Minimally met: DOD officials stated that there is no document that describes the steps performed to develop the Guam effort's costs. However, two of the underlying estimates had some documentation regarding how the estimates were developed in their estimating models.</p> <p>Partially met: Some of the underlying cost estimates include descriptions of the technical requirements and assumptions used to develop the estimates. However, during interviews, DOD officials stated that there is no one document that encapsulates the Guam program requirements. Furthermore, there is a varying level of documentation of the requirements in the underlying cost estimates.</p> <p>Partially met: DOD officials stated that the combined enduring and nonenduring estimate was briefed and approved by decision makers as part of their budget process. However, the briefing does not include a discussion of risks, methods to develop the costs, and underlying assumptions associated with the nonmilitary construction costs necessary for decision makers to gain confidence that the estimate is accurate, complete, and high in quality.</p>

Appendix IV: Assessment Tables of DOD's
Realignment Cost Estimates for Guam
Compared to Characteristics for Reliable Cost
Estimates

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Accurate	Partially met	Results are unbiased, not overly conservative or optimistic, and based on an assessment of most likely costs.	Minimally met: DOD has begun to assess the risks associated with the cost estimate; however, DOD did not perform an analysis to determine the full effect of identified risks on the Guam effort's total cost.
		Has been adjusted properly for inflation.	Partially met: The integrated enduring and nonenduring workbooks use the appropriate inflation indexes for the appropriations used in the cost estimates. The integrating office and those offices developing the underlying cost estimates have an understanding regarding how to adjust an estimate for inflation to prevent misapplication, but it is not apparent that this understanding was followed when developing all the underlying estimates.
		Contains few, if any, minor mistakes.	Fully met
		Is regularly updated to reflect significant changes in the program so that it is always reflecting current status.	Fully met
		Variances between planned and actual costs are documented, explained, and reviewed.	Not applicable: DOD does not have actual costs for the Guam effort's enduring and nonenduring costs at this time.
		Is based on a historical record of cost estimating and actual experiences from other comparable programs.	Partially met: The underlying cost estimates were coordinated with other agencies to gather appropriate historical data relevant to their estimates for the Guam effort; however, the details of the source data are not apparent in all of the estimates.

**Appendix IV: Assessment Tables of DOD's
Realignment Cost Estimates for Guam
Compared to Characteristics for Reliable Cost
Estimates**

Characteristic	Overall assessment summary	Best practice	Best practice assessment
Credible	Minimally met	<p>Includes a sensitivity analysis that identifies a range of possible costs based on varying major assumptions, parameters, and data inputs.</p> <p>A risk and uncertainty analysis was conducted in order to capture the cumulative effect of additional risk.</p> <p>Major cost elements were cross-checked to see whether results were similar.</p> <p>An independent cost estimate was conducted by a group outside the acquiring organization to determine whether other estimating methods produce similar results.</p>	<p>Not met: There is no sensitivity analysis in the combined model or any of the underlying cost estimates.</p> <p>Minimally met: None of the estimates apply a quantifiable risk or uncertainty analysis; however, some of the underlying estimates use other means to account for risk in the estimates.</p> <p>Minimally met: There are no cross-checks in the combined model or included as part of the underlying cost estimates. However, the estimators responsible for one of the underlying cost estimates discussed how they review assumptions with their subject-matter experts as part of their estimating process.</p> <p>Partially met: An independent review took place in 2014 that examined the completeness of the 2010 Guam cost estimate; however, an independent cost estimate has not been performed. Since the review, the estimate has been improved to implement several of the review recommendations, but has not implemented all recommendations.</p>

Source: GAO analysis of Department of Defense (DOD) data. | GAO-17-415

Note: GAO examined the enduring and nonenduring costs and identified 4 of the 53 project codes associated with these costs for a detailed assessment of the underlying cost estimates. Together, the projects associated with these codes constitute approximately 44 percent of the total enduring and nonenduring costs in fiscal year 2012 dollars. The four project codes included: two information technology codes, the facilities sustainment code, and the environmental code.

^aThe life-cycle cost of a program includes both government and contractor costs of the program over its full life cycle, from inception of the program through design, development, deployment, and operation and maintenance to retirement of the program.

^bA Work Breakdown Structure defines in detail the work necessary to accomplish a program's objectives. It reflects the program requirements and provides a basis for identifying resources and tasks for developing a program cost estimate.

^cThe Guam Rainbow Chart is a program-management tool that summarizes detailed program inputs and traces the schedule and dollar value of the tasks included as part of the Department of Defense's \$8.7 billion cap for the relocation to Guam and the Commonwealth of the Northern Mariana Islands. Subject to certain exceptions and adjustments, the total amount DOD may obligate or expend from funds available for military construction for implementation of the Record of Decision for relocation of Marine Corps forces to Guam was limited by the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 to approximately \$8.7 billion. See Pub. L. No. 113-291, § 2821(a) (2014).

^dThe purpose of data normalization is to make a given data set consistent with and comparable to other data used in the estimate. Since data can be gathered from a variety of sources, they are often in many different forms and need to be adjusted before being used for comparison analysis or as a basis for projecting future costs.

^eDOD officials stated that the enduring and nonenduring costs are compiled by project in Excel workbooks. These workbooks are a consolidation tool for the underlying cost models that are developed by various program offices.

Appendix V: Assessment of DOD’s Realignment Cost Estimates for Hawaii and Australia

For this analysis, GAO cost estimation specialists assessed the realignment cost estimates for Hawaii and Australia against the best practices of the comprehensive characteristic for reliable cost estimates and provided an overall assessment for the characteristic. This analysis has five assessment categories for the characteristic: not met (provided no evidence that satisfies any of the criterion), minimally met (provided evidence that satisfies a small portion of the criterion), partially met (provided evidence that satisfies about half of the criterion), substantially met (provided evidence that satisfies a large portion of the criterion), and fully met (provided complete evidence that satisfies the entire criterion). A cost estimate is considered comprehensive if the assessment rating is fully or substantially met. Table 8, below, includes our detailed assessment of the Department of Defense’s (DOD) cost estimates for Hawaii and Australia, including the reasons that DOD’s cost estimates partially met GAO’s comprehensive characteristic.

Table 8: Assessment of DOD’s Realignment Cost Estimates for Hawaii and Australia Compared to GAO’s Comprehensive Characteristic for Reliable Cost Estimates		
Location	Assessment summary	GAO assessment
Hawaii	Partially met	DOD’s cost estimate for Hawaii partially met GAO’s best practices for the comprehensive characteristic as the estimate is well organized and uses standardized military construction facility codes, but there is no Work Breakdown Structure or Work Breakdown Structure dictionary. ^a In addition, the estimate included in the Hawaii siting plan is not comprehensive because it covers only military construction costs associated with relocating Marines to Hawaii and does not include life-cycle costs. ^b DOD officials stated that they plan to develop a life-cycle cost estimate for the Marine relocation to Hawaii within the next few years. Currently the Hawaii siting plan documents and defines, at a high level, the Hawaii military construction effort, its assumptions, and those constraints associated with the military construction effort.
Australia	Partially met	DOD’s cost estimate for Australia partially met GAO’s best practices for the comprehensive characteristic as both of the feasibility studies provided contain ground rules and assumptions to explain the military construction costs that have been estimated for the Australia effort; ^c however, DOD has not examined the life-cycle costs or developed a Work Breakdown Structure.

Source: GAO analysis of Department of Defense (DOD) data. | GAO-17-415

^aA Work Breakdown Structure defines in detail the work necessary to accomplish a program’s objectives. It reflects the program requirements and provides a basis for identifying resources and tasks for developing a program cost estimate.

^bThe Hawaii siting plan was prepared to update congressional committees regarding the relocation of Marines to Hawaii.

^cThe Marine Corps has completed two studies regarding the locations proposed to accommodate the Marine rotational presence (Royal Australian Air Force Base Darwin and Robertson Barracks).

Appendix VI: Comments from the Department of Defense



STRATEGY, PLANS
AND CAPABILITIES

ASSISTANT SECRETARY OF DEFENSE
2400 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-2400

Mr. Brian Lepore
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, NW
Washington DC 20548

Dear Mr. Lepore,

This is the Department of Defense (DoD) response to the GAO Draft Report GAO-17-415, "MARINE CORPS ASIA-PACIFIC REALIGNMENT: DOD Should Address Capability Deficiencies and Infrastructure Risks and Revise Cost Estimates," dated March 1, 2017 (GAO Code 101330).

The Department is providing official written comments for inclusion in the report.

Sincerely,

A handwritten signature in black ink, appearing to be "EC", written over a faint circular background.

Elisabeth Cordray
Deputy Assistant Secretary of Defense for Plans

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**GOVERNMENT ACCOUNTABILITY OFFICE (GAO) DRAFT REPORT DATED
MARCH 1, 2017
GAO-17-415 (GAO CODE 101330)**

**“MARINE CORPS ASIA-PACIFIC REALIGNMENT: DOD SHOULD ADDRESS
CAPABILITY DEFICIENCIES AND INFRASTRUCTURE RISKS AND REVISE COST
ESTIMATES”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS**

RECOMMENDATION: To improve the Department of Defense’s ability to maintain its capability in the Asia-Pacific region, the GAO recommend that the Secretary of Defense direct the appropriate entities to resolve select identified capability deficiencies with respect to its infrastructure plans for the Marine Corps in four areas:

- The movement of Marine Corps units by, for example, reconsidering when to move to Guam;
- Training needs in Iwakuni, Hawaii, and CNMI by, for example, identifying other suitable training areas;
- Reduction in runway length at the Futenma Replacement Facility by, for example identifying other runways that would support mission requirements; and
- Challenges in Australia regarding seasonal changes and biosecurity requirements that affect equipment downtime by, for example, deciding on a location for the wet season and identifying a solution for biosecurity requirements.

DoD RESPONSE: PARTIALLY CONCUR. The Marine Corps has already addressed, where applicable, the select identified capability deficiencies with respect to its infrastructure plans in the movement to Guam, in supporting the development of training opportunities, at the Futenma Replacement Facility (FRF), and in Australia. The Department offers the following detailed explanation of its position on the four sub-recommendations.

The Marine Corps’ plan for movement of units from Okinawa to Guam has carefully considered many factors, including the capabilities required to support U.S. Pacific Command (USPACOM), the logistical requirements associated with the movement of forces and the strategic lift required for operating in a distributed environment, the additional force structure required to maintain and support disaggregated operations, and the cost and time to build facilities. The GAO assessment suggests that adequate planning with regard to minimizing operational downtime of III Marine Expeditionary Force (MEF) forces during the movement to Guam has not been done. The opposite is true. Both USMC and USPACOM have done extensive planning and analysis to determine how best to posture, move, and support distributed III MEF forces. USPACOM explained to the GAO that the existing plan cannot be considered fixed and final because of the requirement to continue adapting to changing conditions. However, those changing conditions do not materially impact the infrastructure required to support a force flow program that is carefully aligned with operational requirements and unit integrity and capability. The Rainbow Chart reflects efforts to determine the minimum amount of facilities necessary to support each unit and to ensure that those identified facilities are

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constructed prior to that unit's movement to Guam. As the GAO recommends, the Department has already designed the force flow to move capability packages, rather than individual units, in order to reduce operational pause due to dependencies between units. The pace at which this movement is executed will continue to take into account the rate at which the required infrastructure is developed. As the GAO recommends, the Marine Corps is already working to ensure that this plan is continually refined to balance fiscal and construction realities with operational risk, capability requirements, and readiness.

Likewise, the Department has already conducted an extensive analysis of the training needs for the Marine Corps and the Joint Force in Iwakuni, Hawaii, and the Commonwealth of the Northern Marianas Islands (CNMI) and the available alternative training locations in the region. USPACOM has identified 42 Combatant Command-level training deficiencies to be fulfilled through the development of training ranges in the USPACOM area of responsibility. Due to the complexity and scale of these training deficiencies, CNMI emerged as the only viable location to address these deficiencies on U.S. territory. However, the proposed ranges in the CNMI will address joint training requirements, not only those of the Marine Corps. The GAO recommends that the Department re-examine potential training locations in the event that it is not able to meet all of its identified training requirements in the CNMI. The Department disagrees that such an exhaustive study is warranted or worthwhile years prior to the development of a new training range in the CNMI.

The Department also disagrees that the length of the runway planned at the FRF at Camp Schwab is a capability deficiency for the Marine Corps. At the time of our agreement with Japan, it was understood that the FRF would not possess a long runway and that the fixed wing operations that the Marine Corps hosts today at Futenma would be accommodated elsewhere when Futenma closes. Consultations in late 2009 and throughout 2010, resulted in the current FRF design constraint of 1800m total length but stressed specific requirements for the overruns (1190m runway with two 305m standard overruns). It was the Marine Corps that drove the final requirements precisely to support the capabilities required for their missions at the FRF.

Finally, Australian domestic requirements for bio-security screening and the reality of extreme seasonal weather impacts were understood at the time the initiative was established and are not capability deficiencies, but real world constraints around which we, and Australia, are working to develop the most bilaterally beneficial annual program possible. The Marine Corps also continues to coordinate closely with the Australian Department of Agriculture, Fisheries and Forestry to develop best practices to train Marines as assistant inspectors and thereby minimize the cost – in time and money – to conduct bio-security inspections.

RECOMMENDATION: To provide DoD with reliable information on potential sources of delays for the design and construction of infrastructure in Guam, the GAO recommend that the Secretary of Defense direct the appropriate entities to update the Marine Corps' integrated master schedule (IMS) for Guam so that it meets the comprehensive, well-constructed, and credible characteristics for a reliable schedule. For example, the update to the schedule should include resources for non-construction activities.

DoD RESPONSE: CONCUR. In September 2016, in response to preliminary engagement with the GAO in support of this report, the Guam IMS stakeholders embarked on a comprehensive update of the Guam IMS. The purpose of the effort is to ensure the IMS, to the extent possible, conforms to the GAO's preliminary comments and the GAO Schedule Assessment Guide. This

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effort is nearing completion and will meet GAO's "well-constructed" and "controlled" characteristics as well as the best practices identified in Table 5. Specifically, the USMC will continue to adopt the comprehensive best practices of "assigning resources to all activities" and "establishing the duration of all activities" as described in Table 5. Currently, all durations and sequencing of events are based on subject matter expertise and prior experience with base construction projects. The updated Guam IMS will improve on previous versions by documenting this information. In addition, the Marine Corps will continue to work to "verify that the schedule can be traced horizontally and vertically" and "conduct a schedule risk analysis."

In addition, while the Guam IMS already includes resources dedicated to non-construction activities, such as force flow, the Marine Corps is procuring Project Recon, a new software risk-management tool approved by DoD to better address risks across a broad range of categories such as construction, execution, funding, scheduled, political, and other factors. This tool will augment the suite of program management tools already employed by the Marine Corps. The Department will provide a briefing to the GAO on the updates made in the new Guam IMS and in its continuing efforts to improve risk management in the Guam Program.

RECOMMENDATION: To provide DoD and Congress with sufficient information to mitigate risks for infrastructure construction and sustainment, the GAO recommend that the Secretary of Defense direct the appropriate entities to complete a Risk Management Plan for Guam, and include, at a minimum, plans to address: (1) construction labor shortages, (2) explosive ordnance detection, (3) cultural artifact discovery and preservation, and (4) protection of endangered species.

DoD RESPONSE: CONCUR. As the GAO notes in the report, the Marine Corps is managing and executing a comprehensive programmatic risk management plan that appropriately addresses the risks outlined in the report and in this recommendation via multiple avenues at the policy and programmatic levels. As the responsible office, Department of the Navy (DON), and specifically the Office of the Assistant Secretary of the Navy for Energy, Installations & Environment (OASN EI&E) is the responsible office, is leading the Department's strategy to address construction labor issues in Guam. In coordination with the U.S. Citizenship and Immigration Services (USCIS), OASN (EI&E) supported legislation submitted by the Delegate from Guam in the fiscal year 2017 (FY 2017) National Defense Authorization Act (NDAA) to address foreign worker visas ahead of projected requirements for off-island construction labor during the peak of the Guam Relocation construction period. Although the provision was not included in the final enacted NDAA for FY 2017, DoD will continue to coordinate with the USCIS, and other agencies to ensure adequate labor resources for contractors executing the Guam Program.

OASN (EI&E) is also leading the strategy to address munitions or explosives of concern (MEC). MEC clearance is a significant risk to cost and schedule, especially during the initial stages of construction that involving land clearance and excavation. The Department of the Navy has taken significant efforts to improve and streamline MEC clearance processes and increase local oversight/management of MEC clearance operations during construction, while maintaining necessary explosive safety posture to protect life and property. In March 2016, the Chief of Naval Operations approved an explosive safety exemption for construction projects in Guam and the Commonwealth of the Northern Mariana Islands that mitigates risk while contributing to potential cost reductions and schedule improvements. The DON conducts

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periodic reviews of explosive safety policy on Guam with all program stakeholders and will continue to consider adjustments, as required.

Likewise, OASN(EI&E) retains overall responsibility and oversight for the management of cultural and natural resources impacted by the Guam Relocation program and required mitigations are addressed in the 2010 and 2015 Records of Decision (ROD), Biological Opinions, and other associated decision documents. Due to the scope and breadth of environmental mitigations associated with the proposed action, the DON has developed a monitoring and mitigation tracking plan (MMTP) to ensure DON compliance and execution of all environmental requirements associated with the Marine Corps Relocation to Guam.

RECOMMENDATION: To provide DoD and Congress with more reliable information to inform funding decisions associated with the relocation of Marines to Guam, the GAO recommend that the Secretary of Defense direct the appropriate entities to revise the cost estimates for Guam to address all best practices established by GAO's cost estimating guide. Specifically, the revisions to the cost estimates should include: a unifying Work Breakdown Structure (WBS), risk and sensitivity analyses, and an independent cost estimate.

DoD RESPONSE: NON-CONCUR. As discussed with GAO during their interviews and in response to previous GAO assessments, the Department does not accept the assertion that GAO's "22 best practices" are universally applicable to a wide range of activities that includes military construction, acquisition, or basing and non-concurs with the GAO's recommendation to revise the cost estimates for Guam to incorporate those practices. As is the case with all of the department's military construction requests, the Guam program was developed and communicated to the Congress consistent with statute and the Department's long-standing supporting policies. Specifically, Section 2802(c) of Title 10, United States Code, requires the Department's budget submission to include information on "cost-effective practices as an element in the project documents." In support of that requirement, the DoD Financial Management Regulation, Volume 2B, Chapter 6, requires inclusion of a DD Form 1391 for each project submitted with the budget request, and that each DD 1391 contain the results of an economic analysis conducted in accordance with DoD Instruction 7041.3, Economic Analysis for Decisions-making; information on the current situation; the requirement; and the operational impact if the project is not provided. Per these regulations, a contractor develops a detailed WBS when the construction contract is awarded, which is much later in the project execution timeline than GAO's expectations. A high-level WBS identifying major project milestones was developed in the Guam IMS, but to recommend a detailed WBS for over 100 independent construction projects prior to any single construction project getting underway is unrealistic.

The Department feels strongly that Section 2802(c) and our long-standing supporting policies provide sufficient information to support military construction decisions, associated requests for authorization and appropriation, and Congressional oversight. In cases where the Congress desires additional information on a particular project beyond that which existing statute/policy require, it routinely requests and receives that information through reporting or certification requirements. Through this process the Department has addresses all Congressional concerns identified to date, as evidences by Congressional authorization and appropriation of project phases reviewed thus far.

UNCLASSIFIED

RECOMMENDATION: To provide DoD and Congress with more reliable information to inform funding decisions associated with the relocation of Marines to Hawaii and the establishment of a rotational presence in Australia, the GAO recommend that the Secretary of Defense direct the appropriate entities to:

- revise the DoD cost estimates for Hawaii to address all best practices for the comprehensive characteristic established by the GAO cost estimating guide, specifically to capture entire lifecycle costs and develop a Work Breakdown Structure.
- revise the DoD cost estimates for Australia to address all best practices for the comprehensive characteristic established by the GAO cost estimating guide, specifically to capture entire lifecycle costs and develop a Work Breakdown Structure.

DoD RESPONSE: PARTIALLY CONCUR. The Department agrees that good cost estimating practices are prudent for good decision-making. However, for reasons of timing or of international agreements, the Department does not agree that it should expend effort to update its cost estimates for the Hawaii and Australia programs today. The Department offers the following detailed explanation of its position on the two sub-recommendations.

High-level cost estimates are sufficient at this early planning stage to make decisions on proposed force movements to Hawaii. Under federal law, an Environmental Impact Statement (EIS) must be completed prior to any construction activities. Typically, the EIS process influences the outcome of the construction action, which means that developing a detailed WBS prior to EIS completion would not be relevant. As stated in relation to the Guam program, the Department does not agree that a detailed WBS is necessary at the programming stage. Upon completion of the EIS, the Department will revise its high-level WBS to inform funding decisions prior to execution. In addition, as discussed with GAO, there is a fundamental disagreement regarding what constitutes the program “lifecycle”. The Department considers that the “program” is complete when forces move and occupy the new facilities. The Department is very concerned about facility lifecycle costs and incorporates best practices for minimizing facility maintenance and sustainment costs into its construction requests.

Per the terms of our bilateral agreement, Australia will support the Marine Corps’ rotational presence, leaving a minimum number of facilities for the Department to construct as a complement. In this way, the costs borne by DoD under this program will be subject to this international agreement, rather than the GAO cost estimating guide. However, where applicable, the Department will endeavor to follow best practices to ensure decision-makers have reliable information.

Appendix VII: GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

In addition to the contact named above, Laura Durland (Assistant Director), Emily Biskup, Scott Bruckner, Juana Collymore, Jennifer Echard, Jason Lee, Jennifer Leotta, Amie Lesser, Carol Petersen, Richard Powelson, Karen Richey, Jodie Sandel, Nancy Santucci, Michael Shaughnessy, Amber Sinclair, and Erik Wilkins-McKee made key contributions to this report.

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